

ANSWERS WITH DETAILED EXPLANATION

UPSC Exam Civil Services (Preliminary)
Examination (GS-I)

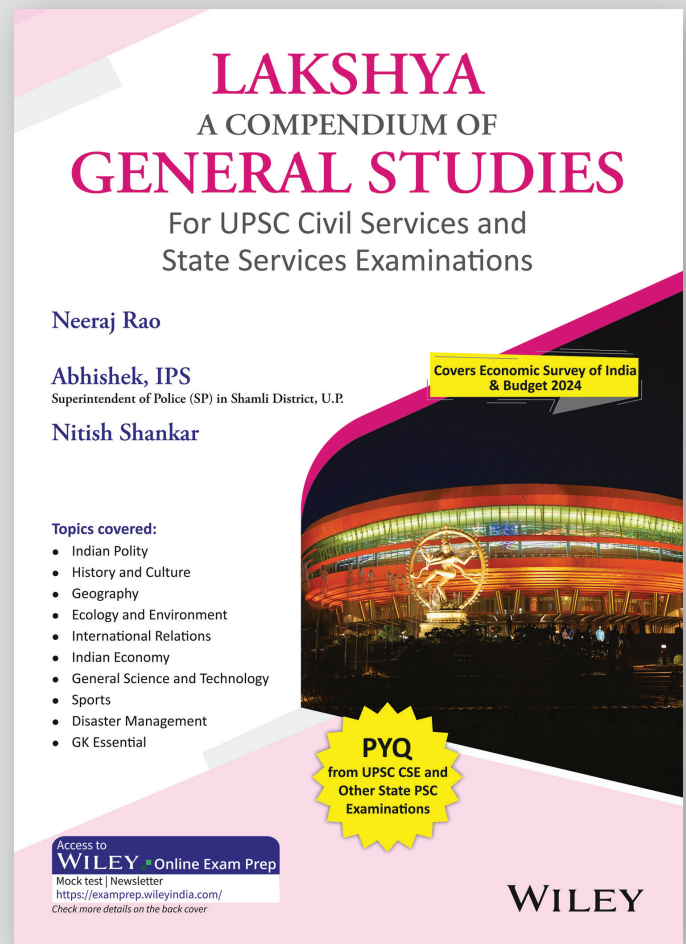
16th June 2024

SET - B

All references are made from

LAKSHYA
A Compendium of
GENERAL STUDIES
for UPSC Civil Services and
State Services Examination

by
Neeraj Rao,
IPS Abhishek Jha
and
Nitish Shankar



Available on

amazon.in
surl.li/aujthg



Q.1. The total fertility rate in an economy is defined as:

- the number of children born per 1000 people in the population in a year.
- the number of children born to a couple in their lifetime in a given population.
- the birth rate minus death rate.
- the average number of live births a woman would have by the end of her child-bearing age.

Ans: (d)

EXPLANATION:

The Total Fertility Rate (TFR) is a standard demographic indicator to estimate the average number of children a woman would have during her childbearing years (i.e. age 15-49), based on current birth trends.

Source:

How is the Total Fertility Rate calculated? (population.gov.sg)

Reference in Lakshya

A Compendium of General Studies:

Indian Economy 9-147

Particulars	NFHS-5 (2019-2021)
Population living in households that use an improved sanitation facility (%)	70.2
Households using clean fuel for cooking (%)	58.6

Life Expectancy

As per the latest estimates, life expectancy at birth was 69.4 years for the period 2014–2018, ranging from the lowest of 65.2 years in Chhattisgarh to the highest at 75.3 years in Kerala and Delhi. It is higher in urban areas (72.6 years) than in rural areas (68.0 years).

Total Fertility Rate

There has been significant improvement in the use of family planning methods and institutional delivery, reaching 66.7% and 88.6%, respectively, in 2019–2021. Total Fertility Rate (TFR) is a demographic indicator that represents the average number of children a woman would have during her reproductive years if she experienced the prevailing age-specific fertility rates of a given population. The total fertility rate in the country has dropped below the replacement level of fertility, set at 2.1 children per woman. Notably, all States/UTs, except for Manipur, Meghalaya, Bihar, Jharkhand, and Uttar Pradesh, have achieved the replacement level of fertility, marking substantial progress in population control measures.

Sex Ratio

Sex ratio (*number of females per 1000 males*) in the total population has risen to 1020 in 2019–2021 (NFHS-5). Also, the sex ratio at birth (*female children per 1000 male children born*) in the last 5 years, has grown to 929 in 2019–2021.

Schemes for Health Sector

Ayushman Bharat

It is a centrally sponsored scheme to achieve universal health coverage. It is comprising of two inter-related components

Ayushman Bharat Health and Wellness Centres (AB-HWCs)

The Ayushman Bharat-Health and Wellness Centers (AB-HWCs) are designed to offer

Comprehensive Primary Health Care (CPHC) by enhancing and reinforcing existing services related to Reproductive & Child Health (RCH), Communicable Diseases and Non-Communicable Diseases. This includes providing free essential drugs and diagnostic services. The initiative aims to gradually incorporate additional primary healthcare services, such as mental health, ENT, Ophthalmology, Oral health, Geriatric and Palliative health care, and Trauma care. Moreover, AB-HWCs focus on health promotion and wellness activities, including practices like Yoga, to enhance overall well-being.

Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)

The second component of Ayushman Bharat is the Pradhan Mantri Jan Arogya Yojana (PM-JAY), implemented by the National Health Authority (NHA) in collaboration with State Governments. This scheme offers health coverage of ₹5 lakhs per family annually for secondary and tertiary care hospitalisations, specifically targeting the bottom 40% of the Indian population. PM-JAY aims to provide financial protection and access to quality healthcare services for vulnerable sections of society.

PM-Ayushman Bharat Health Infrastructure Mission (PM-ABHIM)

Announced in the Budget 2021–2022, this Centrally Sponsored Scheme has an outlay of approximately ₹64,180 crore. It aims to enhance the primary, secondary and tertiary healthcare systems by strengthening existing national institutions and establishing new ones. The scheme is designed to address the detection and treatment of both existing and emerging diseases over the next 5 years, focusing on the overall development and resilience of the healthcare infrastructure in the country.

Pradhan Mantri Swasthya Suraksha Yojana (PMSSY)

This initiative aims to address regional imbalances in the availability of affordable and reliable tertiary healthcare services, as well as to enhance facilities for quality medical education in India. The plan includes the construction of 22 new All India Institutes for Medical Science (AIIMS) and the upgradation of 75 Government Medical Colleges. Approval has been granted

Q.2. Consider the following statements :

- In India, Non-Banking Financial Companies can access the Liquidity Adjustment Facility window of the Reserve Bank of India.
- In India, Foreign Institutional Investors can hold the Government Securities (G-Secs).
- In India, Stock Exchanges can offer separate trading platforms for debts.

Which of statements given above is/are correct?

- 1 and 2 only
- 3 only
- 1, 2 and 3
- 2 and 3 only

Ans: (d)

EXPLANATION:

Statement 1 is incorrect. Liquidity Adjustment Facility (LAF) is available to Scheduled State Co-operative Banks, complying with the prescribed eligibility criteria prescribed for LAF / MSF. The SCBs (excluding Regional Rural Banks and Small Finance Banks) may co-originate loans with Non-Banking Financial Companies.

Statement 2 is correct. FIIs may hold G-Secs subject to limitations prescribed from time to time.

Statement 3 is correct. E.g., Negotiated Trade Reporting Platform of NSE.

Reference in Lakshya

A Compendium of General Studies:

ratio, the less are the deposits which can be loaned out by the bank, and the smaller the MM. Here, it must be noted that the credit creation process also creates a corresponding liability for those who borrow the money. Therefore, though the economy is more liquid in the sense that there is more medium of exchange, there is no increase in wealth of the economy in this process. **MM is measured by RBI as the ratio of M_3 (broad money) and M_0 (narrow money).**

Commercial Banks and Economic Development of a Country

Capital Formation: Banks mobilise savings of people scattered through an economy and redistribute them through their branches for productive purposes. Nowadays, attractive schemes are also offered to induce savings and prevent money from lying idle.

The Creation of Credit Banks' Funds: Investment projects, leading to increased production, employment and overall economic growth. Funding investment projects leads to increased production, employment and so on.

Encouraging Appropriate Industries: Banks play a role in redistributing credit, ensuring funds are directed towards the right sectors. This may include sub-prime lending for the development of priority sectors, for instance, cottage industries in villages.

Monetisation of Debt: Manufacturers and wholesale traders cannot increase their sales without transacting on credit basis. Commercial banks transform the loans to be repaid after a certain period into cash by discounting bills of exchange to ensure that economic activities continue without any disruption.

Financing Government: Banks provide long-term credit to governments by investing in government securities and short-term credit by purchasing Treasury Bills.

Promoting Entrepreneurship: Banks have even started taking up the well-formulated projects in recent times and also provide technical and managerial guidance for the same.

Employment Generation: The growth of the banking system itself generates employment opportunities, contributing to overall employment generation in the economy.

Non-banking Financial Institution (NBFI) or Non-banking Financial Company (NBFC)

A non-banking financial institution (NBFI) or non-banking financial company (NBFC) is a financial entity that engages in borrowing (accepting deposits) and lending (issuing loans) activities without possessing a full banking license. Unlike traditional banks, NBFIs are not under the direct supervision of the central bank or the Reserve Bank of India. They operate in both money and capital markets. NBFIs can be classified into two main categories:

1. Stock Exchange

This category includes entities involved in stock market operations and related financial activities.

2. Other Financial Institutions

This category encompasses various financial entities such as finance companies/corporations, chit funds, building societies, investment trusts, unit trusts, insurance companies, finance companies and issue houses. These institutions contribute to the financial landscape by providing diverse financial services beyond traditional banking.

Reserve Bank of India (RBI)

History: It was formed on 1 April 1935 in pursuance of the RBI Act, 1934. RBI was nationalised on 1 January 1949. Osborne Smith was the first Governor of RBI.

Administration: RBI is the central bank and central monitoring authority which manages the currency, money supply and interest rates. It is governed by a governor, and four deputy governors, along with the Central Board of Directors appointed by the GoI.

Functions

- ◆ **Issuer of Currency**—RBI has the exclusive authority to issue currency notes and oversees the country's credit system. It plays a crucial role in preventing the circulation of counterfeit currency.
- ◆ **Banker to the Central and State Governments:**
 - Manages funds and conducts payments on behalf of the government.
 - Provides short-term credit and handles the issuance of government loans.

rate in deficit conditions (cheaper to lend to and borrow from the central bank than the market).

Repo Rate: It is the rate at which RBI lends funds to commercial banks. A rise in repo rate restricts liquidity in the market and is used to control inflation and conversely.

Reverse Repo Rate: It is the rate at which RBI borrows from commercial banks. An increase in reverse repo rate makes it lucrative for commercial banks to park their funds with RBI and reduces liquidity conversely.

Therefore, the new LAF framework has been developed, as shown in Figure 9.20, with the following modifications:

- The **weighted average overnight call money rate** has been explicitly recognised as the operating target of monetary policy.
- The repo rate has been made the *only independently varying policy rate*.
- A new **Marginal Standing Facility (MSF)** has been instituted in which scheduled commercial banks may borrow overnight up to 1% of their respective net demand and time liabilities (NDTL) at a rate 100 base points above the repo rate.
- The revised corridor has been defined with a fixed rate of 50 bps. The repo rate lies in the middle of the corridor, the MSF rate 25 basis points above it and the reverse repo rate 25 basis points below it. MSF and reverse repo rate move in line with the repo rate. With the introduction of Standing Deposit Facility (SDF), it seems to have become the LAF floor corridor though reverse repo rate still remains a potent tool.
- Instruments of liquidity management include fixed and variable rate repo/reverse repo auctions, outright open market operations (OMOs), forex swaps and other instruments as may be deployed from time to time.

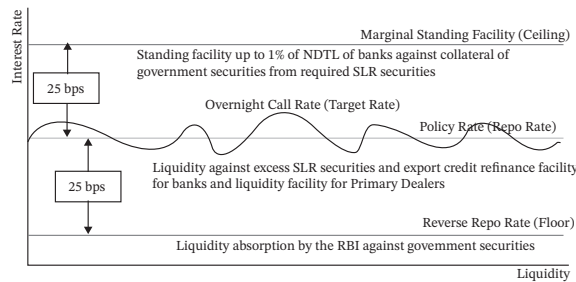


Figure 9.20 Revised LAF Framework

Effectiveness of LAF Framework

Practical evidence indicates that the effectiveness of policy signals is limited when there is excess liquidity in the financial system, but it becomes more pronounced when the system faces a liquidity deficit. There is a notable connection between the weighted average overnight call rate and various other interest rates in the money market. Surplus liquidity typically arises from an increase in net foreign assets (NFA) or net domestic assets (NDA), or both. In such scenarios, tools like cash reserve ratio (CRR)

and market stabilisation scheme (MSS) can be employed to shift the system towards a deficit.

Limitations of Monetary Interventions

The central bank does not influence the saving habits of households. The deposits of the banking system and the money multiplier are linked to the deposits made by consumers. Therefore, if people lose trust in the banking system and prefer to keep more cash, the money supply decreases without any direct action from the central bank. Additionally, the central bank does not dictate the

Q. 3. In India, which of the following can trade in Corporate Bonds and Government Securities ?

1. Insurance Companies
2. Pension Funds
3. Retail Investors

Select the correct answer using the code given below:

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

EXPLANATION:

Retail Investors were recently permitted to invest in G-Secs through RBI's Retail Direct scheme.

Reference in Lakshya

A Compendium of General Studies:

and Russia extended voluntary oil production cuts) as well as liquidity measures taken by RBI in its monetary policy (unchanged repo rate).

- ◆ They may also access Secondary market through Negotiated Dealing System-Order Matching (NDS OM) - RBI's trading system, previously accessible only to a few financial institutions.

Retail Direct Scheme has been launched by RBI to facilitate direct access to the G-sec market to retail investors, which was earlier accessible only to institutional investors (SCBs, Insurance Companies and Mutual Funds) -

- ◆ The retail investors can now open Retail Direct Gilt (RDG) account through an online portal and directly invest ₹10,000 to ₹2 crores per security.
- ◆ They can place a non-competitive bid in primary issuance of all G-Secs such as Treasury Bills and bonds.

Stable over the last decade, the debt-to-GDP ratio has risen sharply due to the global inflation, Taper Tantrum, COVID-19, Russia-Ukraine War, etc. and stood at 58.3 per cent of GDP at the end of Q12023-24. The ratio of interest payments to revenue receipts, i.e., debt-service ratio - another major component of revenue expenditure, however, is expected to increase to 41.0 per cent. The trends in debt and interest payments of Central Government is shown in Figure 9.71 and Figure 9.72.

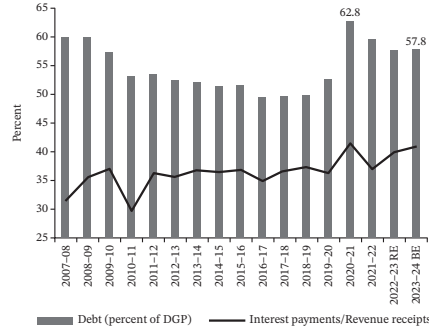


Figure 9.71 Debt and Interest Burden of Central Government.

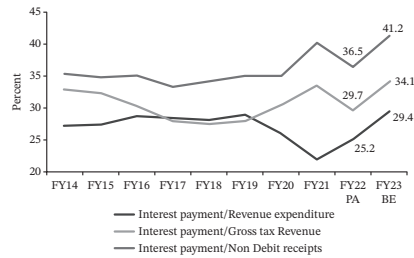


Figure 9.72 High Interest Payments as percentage of receipts, to be brought down.

Q.4. Consider the following :

1. Exchange-Traded Funds (ETF)
2. Motor vehicles
3. Currency swap

Which of the above is/are considered financial instruments ?

- (a) 1 only
 (b) 2 and 3 only
 (c) 1, 2 and 3
 (d) 1 and 3 only

Ans: (d)

EXPLANATION:

An ETF is a pooled investment security that can be bought and sold like an individual stock. Futures contracts, forwards, options, and swaps are derivatives, a category of financial instruments. Currency swaps are over the counter (OTC) financial instruments, i.e., they are not traded on a centralized exchange, rather negotiated between two parties.

Q.5. With reference to the sectors of the Indian economy, consider the following pairs:

	Economic activity	Sector
1.	Storage of agricultural produce	Secondary
2.	Dairy farm	Primary
3.	Mineral exploration	Tertiary
4.	Weaving cloth	Secondary

How many of the pairs given above are correctly matched ?

- (a) Only one (b) Only two
(c) Only three (d) All four

Ans: (b)

EXPLANATION:

Storage of Agricultural Produce - Primary Activity

Dairy Farm - Primary Activity

Mineral Exploration - Primary Activity

Weaving Cloth - Secondary Activity

Q.6. Consider the following materials :

- | | |
|--------------------------------|--------------------|
| 1. Agricultural residues | 2. Corn grain |
| 3. Wastewater treatment sludge | 4. Wood mill waste |

Which of the above can be used as feedstock for producing Sustainable Aviation Fuel?

- (a) 1 and 2 only (b) 3 and 4 only
(c) 1, 2, 3 and 4 (d) 1, 3 and 4 only

Ans: (c)

EXPLANATION:

SAF derived from wastes and residues. This can include agricultural waste, municipal waste (black bin waste), wood residues, waste industrial gases, sewage sludge, algae and cover crops (Corn can be considered a cover crop).

Source:

Feedstocks for a sustainable aviation fuel industry - Innovate UK Business Connect (ktn-uk.org)

Q.7. With reference to physical capital in Indian economy, consider the following pairs :

	Items	Category
1.	Farmer's plough	Working capital
2.	Computer	Fixed capital
3.	Yarn used by the weaver	Fixed capital
4.	Petrol	Working capital

How many of the above pairs are correctly matched?

- (a) Only one (b) Only two
(c) Only three (d) All four

Ans: (b)

EXPLANATION:

Farmer's plough, Computer, and Weaver's Yarn are all fixed capitals. Petrol is used for day to day working operation.

Fixed Capital refers to the capital, which is invested in procuring fixed assets for business. On the other hand, working capital represents the amount of money utilized for financing day to day business operations.

Q.8. Which one of the following words/phrases is most appropriately used to denote “an interoperable network of 3D virtual worlds that can be accessed simultaneously by millions of users, who can exert property rights over virtual items”?

- (a) Big data analytics (b) Cryptography
(c) Metaverse (d) Virtual matrix

Ans: (c)

EXPLANATION:

The most appropriate word/phrase to describe the given concept is “metaverse”. The term “metaverse” refers to an interconnected network of 3D virtual worlds that can be accessed by millions of users simultaneously. Users can create and own virtual items within the metaverse.

Source:

<https://www.economist.com/culture/2022/07/27/in>

Q.9. With reference to the rule/rules imposed by the Reserve Bank of India while treating foreign banks, consider the following statements :

1. There is no minimum capital requirement for wholly owned banking subsidiaries in India.
2. For wholly owned banking subsidiaries in India, at least 50% of the board members should be Indian nationals.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (d)

EXPLANATION:

Statement 1 is incorrect. The initial minimum paid-up voting equity capital for a WOS shall be Rs.5 billion for new entrants. Existing branches of foreign banks desiring to convert into WOS shall have a minimum net worth of Rs.5 billion. The WOS shall meet the Basel III requirements on a continuous basis from the time of its entry / conversion. WOS shall, however, maintain a minimum capital adequacy ratio, on a continuous basis for an initial period of 3 years from the commencement of its operations, at 10 per cent. WOS of foreign banks may raise rupee resources through issue of non-equity capital instruments.

Statement 2 is incorrect. Not less than fifty per cent of the directors should be Indian nationals or NRIs or PIOs subject to the condition that not less than 1/3rd of the directors are Indian nationals resident in India.

Q.10. With reference to Corporate Social Responsibility (CSR) rules in India, consider the following statements:

1. CSR rules specify that expenditures that benefit the company directly or its employees will not be considered as CSR activities.
2. CSR rules do not specify minimum spending on CSR activities.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (a)

EXPLANATION:

Statement 1 is correct. The Corporate Social Responsibility (CSR) Amendment Rule 2021 has made this provision.

Statement 2 is incorrect. The Board of Directors of every company under CSR provisions must ensure that the company spends in every financial year at least 2% of its average net profits made during the immediately preceding three financial years as per its CSR policy. If the company has not completed three financial years since its incorporation, it must spend 2% of its average net profits made during the immediately preceding financial years as per its CSR policy.

11. With reference to radioisotope thermoelectric generators (RTGs), consider the following statements:

1. RTGs are miniature fission reactors.
2. RTGs are used for powering the onboard systems of spacecrafts.
3. RTGs can use Plutonium-238, which is a by-product of weapons development.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Ans: (b)

EXPLANATION:

Radioisotope thermoelectric generators (RTGs) convert heat from radioactive decay into electricity using thermocouples. They power spacecraft and remote installations, providing reliable energy for decades. RTGs are crucial for missions where solar power is impractical, such as deep space exploration, due to their longevity and durability in harsh environments. Statement 1 is incorrect. RTGs are not miniature fission reactors. Instead, they rely on the natural radioactive decay of plutonium-238 to generate heat, which is then converted into electricity using thermocouples. No nuclear fission occurs in RTGs.

Statement 2 is correct. RTGs provide electrical power for spacecraft, especially in situations where solar power is impractical or insufficient. They have been used in more than two dozen U.S. space missions since 1961.

Statement 3 is correct: As per the given combination of options RTGs can use Plutonium-238, which is a byproduct of weapons development.

Note: Many standard sources including NASA clearly mention that Plutonium-238 is not a weapon grade material. So accordingly, the answer should be 2 only. But there is no such option available, so considering 2 and 3 as the answer until UPSC releases the final answer key.

Source:

<https://science.nasa.gov/mission/cassini/radioisotope-thermoelectric-generator/>

https://www.wired.com/images_blogs/wiredscience/2013/09/final72005faqs.pdf

<https://www.acs.org/education/whatischemistry/landmarks/plutonium-238-production.html>

<https://world-nuclear.org/information-library/nuclear-fuel-cycle/fuel-recycling/plutonium#:~:text=The%20decay%20heat%20of%20Pu,satellites%2C%20navigation%20beacons%2C%20etc.>

<http://large.stanford.edu/courses/2022/ph241/spaugh1/>

12. Consider the following statements :

Statement-I : Giant stars live much longer than dwarf stars.

Statement-II : Compared to dwarf stars, giant stars have a greater rate of nuclear reactions.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (d)

EXPLANATION :

Statement- I is incorrect: Giant stars actually have shorter lifetimes compared to dwarf stars. Their massive cores burn through nuclear fuel more rapidly, leading to a shorter overall lifespan.

Statement-II is correct: Giant stars, due to their higher mass, have hotter and denser cores. As a result, they experience more intense nuclear reactions, which contribute to their brightness and energy output.

Source:

<https://solarsystem.nasa.gov/genesismission/gm2/mission/pdf/Giantstars.pdf>

13. Which one of the following is synthesised in human body that dilates blood vessels and increases blood flow ?

- (a) Nitric oxide
- (b) Nitrous oxide
- (c) Nitrogen dioxide
- (d) Nitrogen pentoxide

Ans: (a)

EXPLANATION :

Nitric Oxide (NO) is synthesized in the human body and plays a crucial role in vasodilation, which increases blood flow. The body produces nitric oxide from the amino acid L-arginine using the enzyme nitric oxide synthase (NOS). The primary site of NO synthesis is the inner layer of blood vessels (the endothelium), although other cell types also contribute to its production.

NO acts as a powerful vasodilator, relaxing vascular smooth muscles in arteries. This dilation increases blood flow, benefiting overall cardiovascular health.

It also serves as a neurotransmitter and is involved in various functions, including neuronal activity and learning.

Source:

<https://indianexpress.com/article/health-wellness/new-study-dark-chocolate-blood-pressure-9126904/>

<https://www.britannica.com/science/nitric-oxide>

14. Consider the following activities :
1. Identification of narcotics on passengers at airports or in aircraft
 2. Monitoring of precipitation
 3. Tracking the migration of animals

In how many of the above activities can the radars be used ?

- | | |
|---------------|--------------|
| (a) Only one | (b) Only two |
| (c) All three | (d) None |

Ans: (c)

EXPLANATION :

Radars use radio waves to detect and locate objects by transmitting pulses and analysing the reflected signals. They measure distance, speed, and direction, playing a vital role in aviation, maritime navigation, weather forecasting, and military applications. Radars enable precise tracking and surveillance over long distances and in various conditions.

Statement 1 is correct: Radars can be used for the identification of narcotics (drugs) on passengers at airport and/or in aircraft.

Statement 2 is correct: Radars are extensively used for monitoring of precipitation. Weather radars (specifically Doppler radars) are instrumental in monitoring and tracking precipitation, measuring the intensity of rainfall, and predicting weather patterns.

Statement 3 is correct: Radars can be used to track the migration of animals, particularly birds and bats. Radar technology helps in monitoring flight patterns and migration routes of these animals over large distances.

Source:

<https://www.nationalguard.mil/News/Article/572811/stopping-drug-traffickers-by-air/>
[https://www.sciencedirect.com/topics/earth-and-planetary-sciences/meteorological-radar#:~:text=Weather%20radar%20observation%20can%20be,radar%20observations%20\(Figure%2010\),https://www.usgs.gov/centers/national-innovation-center/science/new-wildlife-tag-enabling-animal-tracking-using-weather](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/meteorological-radar#:~:text=Weather%20radar%20observation%20can%20be,radar%20observations%20(Figure%2010),https://www.usgs.gov/centers/national-innovation-center/science/new-wildlife-tag-enabling-animal-tracking-using-weather)

15. Consider the following aircraft :
- | | |
|---------------|-----------|
| 1. Rafael | 2. MiG-29 |
| 3. Tejas MK-1 | |

How many of the above are considered fifth generation fighter aircraft ?

- | | |
|----------------|--------------|
| (a) Only one | (b) Only two |
| (c) Only three | (d) All four |

Ans: (d)

EXPLANATION:

- Fifth-generation fighters include major technologies developed during the first part of the 21st century. They typically have characteristics like stealth, super cruise (prolonged supersonic cruise without reheat), advanced avionics, and networked data fusion for situational awareness. Examples of combat-ready fifth-generation fighters include the Lockheed Martin F-22 Raptor, Lockheed Martin F-35 Lightning II, Chengdu J-20, and Sukhoi Su-57.
- Option 1 is incorrect: The Rafale is a fourth generation (4.5th) fighter jet developed by France.
- Option 2 is incorrect: The MiG-29 is also a fourth-generation fighter jet developed by Russia.
- Option 3 is incorrect: The Tejas MK-1 is an indigenous Indian fighter, but it falls under the fourth generation (4.5th generation) as well.

Source:

<https://www.thehindu.com/news/national/hal-conducts-successful-first-flight-of-light-combat-aircraft-tejas-mk1a/article68002664.ece#:~:text=The%20agreement%20was%20aimed%20at,for%20the%20Indian%20Air%20Force.>
<https://economictimes.indiatimes.com/news/defence/mighty-flawed-dragon-iaf-rafales-outclass-overhyped-chinese-j-20-fighter-jet/articleshow/108858255.cms?from=mdr>
<https://economictimes.indiatimes.com/news/defence/mighty-flawed-dragon-iaf-rafales-outclass-overhyped-chinese-j-20-fighter-jet/articleshow/108858255.cms?from=mdr>

16. In which of the following are hydrogels used ?
1. Controlled drug delivery in patients
 2. Mobile air-conditioning systems
 3. Preparation of industrial lubricants

Select the correct answer using the code given below:

- | | |
|------------------|------------------|
| (a) 1 only | (b) 1 and 2 only |
| (c) 2 and 3 only | (d) 1, 2 and 3 |

Ans: (d)

EXPLANATION:

- Hydrogels are water-absorbent, crosslinked polymer networks that can hold large amounts of water. They are used in medical applications, such as wound dressings, drug delivery systems, and tissue engineering. Hydrogels' biocompatibility, flexibility, and responsiveness to environmental changes make them valuable in biotechnology and soft robotics.
- Statement 1 is correct: Hydrogels are widely used in controlled drug delivery systems because they can encapsulate drugs and release them in a controlled manner over time. This application leverages the hydrophilic nature and biocompatibility of hydrogels.
- Statement 2 is correct: Hydrogels can be used in mobile air-conditioning systems. They can absorb and release moisture, which can be useful in humidity control, a crucial aspect of air-conditioning.
- Statement 3 is correct: Hydrogels can be used in industrial lubricants to improve their properties, such as reducing friction and wear, controlling viscosity, and improving thermal stability.

Source:

<https://www.thehindu.com/sci-tech/science/iacs-fabricates-hydrogels-with-tunable-bactericidal-activities/article29362252.ece>
<https://www.thehindu.com/sci-tech/health/jncasr-scientists-develop-pancreas-mimicking-system-for-responsive-insulin-delivery-in-diabetes-treatment/article67975149.ece>
[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6384686/#:~:text=Poly\(ethylene%20glycol\)%20hydrogels%20are,off%2Dtarget%20sites%20are%20alleviated.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6384686/#:~:text=Poly(ethylene%20glycol)%20hydrogels%20are,off%2Dtarget%20sites%20are%20alleviated.)
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9858193/>

17. Which one of the following is the exhaust pipe emission from Fuel Cell Electric Vehicles, powered by hydrogen?
- | | |
|-----------------------|------------------|
| (a) Hydrogen peroxide | (b) Hydronium |
| (c) Oxygen | (d) Water vapour |

Ans: (d)

EXPLANATION:

The exhaust air from Fuel Cell Electric Vehicles (FCEVs) powered by hydrogen consists of pure water vapor. FCEVs emit only water vapor, making them locally emission-free and contributing to cleaner air in cities.

Source:

<https://www.thehindu.com/news/national/indianoil-unveils-indias-first-green-hydrogen-run-bus-that-emits-just-water/article67344306.ece>
<https://indianexpress.com/article/explained/explained-economics/the-problem-with-battery-electric-vehicles-8822335/>
<https://afdc.energy.gov/vehicles/fuel-cell>

18. Recently, the term “pumped-storage hydropower” is actually and appropriately discussed in the context of which one of the following?
- | | |
|--|-------------------------------------|
| (a) Irrigation of terraced crop fields | (b) Lift irrigation of cereal crops |
| (c) Long duration energy storage | (d) Rainwater harvesting system |

Ans: (c)

EXPLANATION:

The term “pumped-storage hydropower” relates to long-duration energy storage. It refers to a type of hydroelectric energy storage where two water reservoirs at different elevations are used to generate power. Water moves down from one reservoir to the other (discharge), passing through a turbine, and then requires power to be pumped back into the upper reservoir (recharge).

Source:

<https://indianexpress.com/article/business/tata-power-to-start-work-on-two-pumped-hydro-projects-in-maharashtra-by-mid-2024-9046472/>
<https://indianexpress.com/article/business/after-coal-and-gas-govt-bolsters-hydro-capacity-to-meet-rising-peak-demand-9322704/>
<https://www.energy.gov/eere/water/pumped-storage-hydropower>

19. “Membrane Bioreactors” are often discussed in the context of :
- | | |
|--|---------------------------------------|
| (a) Assisted reproductive technologies | (b) Drug delivery nanotechnologies |
| (c) Vaccine production technologies | (d) Wastewater treatment technologies |

Ans: (d)

EXPLANATION:

“Membrane Bioreactors” are commonly discussed in the context of wastewater treatment technologies. These systems combine biological treatment (using microorganisms) with membrane filtration to efficiently remove pollutants from wastewater. The membranes act as barriers, allowing clean water to pass through while retaining suspended solids and microorganisms. Membrane bioreactors are widely used in treating domestic and industrial wastewater.

Source:

<https://www.thehindu.com/news/cities/chennai/all-government-hospitals-to-have-effluent-treatment-plants-for-better-biomedical-waste-management/article67116298.ece>
<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1759750>
<https://www.pcmembranes.com/articles/membrane-bioreactors-mbr-for-wastewater-treatment/>

20. With reference to the Indian economy, “Collateral Borrowing and Lending Obligations” are the instruments of :
- | | |
|------------------|------------------|
| (a) Bond market | (b) Forex market |
| (c) Money market | (d) Stock market |

Ans: (c)

EXPLANATION:

A Collateralized Borrowing and Lending Obligation (CBLO) is a money market instrument that represents an obligation between a borrower and a lender concerning the terms and conditions of a loan.

21. Consider the following statements :
1. Donyi Polo Airport
 2. Kushinagar International Airport
 3. Vijayawada International Airport

In the recent past, which of the above have been constructed as Greenfield projects ?

- | | |
|------------------|------------------|
| (a) 1 and 2 only | (b) 2 and 3 only |
| (c) 1 and 3 only | (d) 1, 2 and 3 |

Ans: (a)

EXPLANATION:

‘Donyi Polo or Hollongi Airport is the first greenfield airport in Itanagar’ in Arunachal Pradesh inaugurated in 2022. Government of India has accorded ‘In-Principle’ approval for setting up of 21 new Greenfield Airports namely, Mopa in Goa, Navi Mumbai, Shirdi and Sindhudurg in Maharashtra, Kalaburagi, Vijayapura, Hassan and Shivamogga in Karnataka, Dabra (Gwalior) in Madhya Pradesh, Kushinagar and Noida (Jewar) in Uttar Pradesh, Dholera and Hirasar in Gujarat, Karaikal in Puducherry, Dagadathi, Bhogapuram and Orvakal (Kurnool) in Andhra Pradesh, Durgapur in West Bengal, Pakyong in Sikkim, Kannur in Kerala and Hollongi (Itanagar) in Arunachal Pradesh across the country. Out of these, 11 Greenfield airports viz. Durgapur, Shirdi, Kannur, Pakyong, Kalaburagi, Orvakal (Kurnool), Sindhudurg, Kushinagar, Itanagar, Mopa and Shivamogga have been operationalised. Vijaywada is not one among the greenfield airports, though it is an international airport.

Source:

Press Information Bureau (pib.gov.in)

22. With reference to “water vapour”, which of the following statements is/are correct?
1. It is a gas, the amount of which decreases with altitude.
 2. Its percentage is maximum at the poles.

Select the answer using the code given below:

- | | |
|------------------|---------------------|
| (a) 1 only | (b) 2 only |
| (c) Both 1 and 2 | (d) Neither 1 nor 2 |

Ans: (a)

EXPLANATION:

- Statement 1 is correct. Water vapour is a variable gas in the atmosphere, which decreases with altitude.
- Statement 2 is incorrect. Water vapour decreases from the equator towards the poles. In the warm and wet tropics, it may account for four per cent of the air by volume, while in the dry and cold areas of desert and polar regions, it may be less than one per cent of the air.

Source:

<https://www.ncert.nic.in/ncerts/l/kegy208.pdf>

(Continued)

Ramsar Site (State/UT)	Inclusion Year
Sakhya Sagar Lake (Madhya Pradesh)	2022
Tampara Lake (Odisha)	2022
Hirakud Reservoir (Odisha)	2022
Ansupa Lake (Odisha)	2022
Yashwant Sagar (Madhya Pradesh)	2022
Chitragudi Bird Sanctuary (Tamil Nadu)	2022
Suchindram Theroor Wetland Complex (Tamil Nadu)	2022
Vaduvur Bird Sanctuary (Tamil Nadu)	2022
Kanjirankulam Bird Sanctuary (Tamil Nadu)	2022
Thane Creek (Maharashtra)	2022
Hygam Wetland Conservation Reserve (Jammu and Kashmir)	2022
Shallbugh Wetland Conservation Reserve (Jammu and Kashmir)	2022

Environmental Issues

Climate Change

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, such as through changes in the solar cycle, but human activity has been the primary cause of climate change since the 1800s, mostly as a result of burning fossil fuels like gas, coal, and oil.

Some of the widespread effects on the environment include the melting of glacier and ice sheets, breaking up of river and lake ice, floral and faunal geographical range shifting, accelerated sea level rise and longer more intense heat waves and cyclonic storms and droughts.

Global Warming

It is the long-term heating of earth surface observed since the pre-industrial. Between 1850 and 1900, human activity—primarily the burning of fossil fuels—increased the amount

of greenhouse gases in the Earth's atmosphere. This term is not interchangeable with the term climate change. It is caused due to natural and manmade reasons.

Weather	Climate
Weather refers to atmospheric conditions that occur locally over short periods of time. Example includes rain snow, clouds winds, thunderstorms etc.	Climate refers to the long-term (usually at least 30 years) regional or even global average of temperature, humidity and rainfall patterns over the years. For example , the Mediterranean type of climate

Greenhouse Gases and the Greenhouse Effect

A greenhouse gas is one that heats up when it absorbs infrared radiation from the Sun and moves through the atmosphere before escaping into space. Maintaining the proper temperature of our planet for life depends on greenhouse gas emissions. These gases, which occur naturally in the atmosphere, include water vapour, carbon dioxide, methane, nitrous oxide, tropospheric ozone, and fluorinated gases also known as chlorofluorocarbons (CFCs) (Table 5.17).

Table 5.17 Kyoto Gases (IPCC 2007)

Greenhouse Gas	Global Warming Potential (GWP)
Carbon dioxide (Co ₂)	1
Methane (CH ₄)	25
Nitrous oxide (N ₂ O)	298
Hydrofluorocarbons (HFCs)	124–14,800
Perfluorocarbons (PFCs)	7,390–12,200
Sulfur hexafluoride (SF ₆)	22,800
Nitrogen trifluoride (NF ₃)	17,200

The main sources of anthropogenic greenhouse gases include burning fossil fuel, agriculture, forestry and other land use, industries, and aerosols.

Global Warming potential of a gas is the relative capability to trap heat within the atmosphere. This measurement is done in comparison to an equal mass of carbon dioxide (one tonne of CO₂) (Table 5.18).

Table 5.18

Greenhouse Gas	Description
Water vapour	Naturally present, the biggest contributor to greenhouse effect, with the shortest life span
Carbon dioxide	Naturally present, primary greenhouse gas produced through anthropogenic activities
Nitrous oxide	Naturally present, anthropogenic activities like agriculture fossil fuel burning waste management and industrial processes
Methane	Naturally present, emitted from wetlands marches and raising of livestock
Fluorinated gases	Includes HFCs, PFCs and SF6, These have very high global warming potential,
Black carbon (particulate air pollutant)	Also known as soot, A product of incomplete combustion, strongest absorber of sunlight, heats the air directly
Brown carbon (soot+dust)	A component of organic aerosol, emitted mainly in biomass combustion

Greenhouse effect is the warming of the Earth's surface and troposphere due to the presence of greenhouse gases in the atmosphere. Of these gases, water vapour has the largest effect (Figure 5.14).

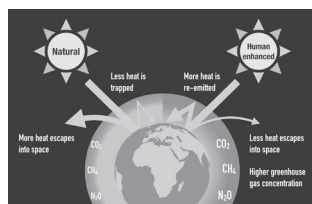


Figure 5.14 Greenhouse effect

The phrase 'greenhouse effect' was first attributed to French mathematician Joseph Fourier.

Climate Change Mitigation

Various strategies of carbon sequestration, such as terrestrial sequestration and geological sequestration, are used. Carbon sequestration is the process of capturing carbon dioxide present in the atmosphere. Additionally, it also captures CO₂ from power plants and factories before being released into the atmosphere. It is of two types.

Terrestrial sequestration makes use of plants and trees to store CO₂ in their bodies and roots.

Geological sequestration involves burying the carbon dioxide in huge depths underground (Table 5.19).

Table 5.19 Terms related to carbon

Term	Description
Carbon Sink	An absorber of carbon is a carbon sink where more carbon is absorbed than is released as carbon dioxide.
Carbon credit	Reducing greenhouse gas emissions to offset emissions from other sources is known as a carbon credit. The unit of measurement is equivalent to carbon dioxide. They are finite, tradeable, and traceable.

(Continues)

23. Consider the following description:
- Annual and daily range of temperatures is low.
 - Precipitation occurs throughout the year.
 - Precipitation varies between 50 cm - 250 cm.

What is this type of climate?

- | | |
|-------------------------------|-------------------------------|
| (a) Equatorial climate | (b) China type climate |
| (c) Humid subtropical climate | (d) Marine West coast climate |

Ans: (d)

EXPLANATION:

Marine West coast climate is located poleward from the Mediterranean climate on the West coast of the continents. The main areas are: Northwestern Europe, West coast of North America, North of California, Southern Chile, Southeastern Australia and New Zealand. Due to marine influence, the temperature is moderate and in winter, it is warmer than for its latitude. The mean temperature in summer months ranges from 15°-20°C and in winter 4°-10°C. The annual and daily ranges of temperature are small. Precipitation occurs throughout the year. Precipitation varies greatly from 50-250 cm.

Source:

<https://ncert.nic.in/ncerts/l/kegy212.pdf>

Climate

- ◆ The long-term average of the weather in a particular area is referred to as the climate. It encompasses various meteorological factors like temperature, humidity, precipitation, wind patterns and more. Climate is characterised by assessing weather data over an extended period, typically 30 years or more, to provide a reliable representation of the prevailing conditions.
- ◆ Several key factors influence the climate of a region, including:
 - ◆ **Latitude and Earth's Axis Tilt:** A region's latitude and the tilt of the Earth's axis affect how much solar radiation it receives, which affects temperature and causes seasonal variations.
 - ◆ **Distribution of Land and Sea:** Proximity to large bodies of water moderates climate, while landmasses heat and cool more rapidly.
 - ◆ **Altitude and Topography:** Elevation affects temperature and precipitation. Higher altitudes tend to be cooler, and mountains can influence weather patterns.
 - ◆ **Location in Relation to Earth's Circulation Belts:** The position of a region in relation to atmospheric circulation patterns, like the trade winds and prevailing westerlies, also impacts climate.

Climate Classification

- ◆ Climate classification is based on multiple parameters such as temperature, rainfall, evaporation, evapotranspiration and water balance. Various systems exist for categorising climate types.
- ◆ In 1905, the British geographer Alfred H. Herbertson was one of the first to propose a systematic division of the Earth into major natural regions based on climate.
- ◆ The Köppen climate classification, which was created by climatologist Wladimir Köppen in the early 20th century, is one well-known and utilised system. It categorises climate into several distinct types based on temperature and precipitation patterns, and it provides valuable information for understanding regional climates around the world.

Types of Climate

Tropical Rain Forest Climate

- ◆ This climate is alternatively known as the equatorial climate or Selvas and falls under the category of a Megathermal Biome, characterised by an average temperature of 18°C or above in every single month of the year.
- ◆ Typically located within 5°–10° of the equator, this climate experiences nearly equal durations of day and night.
- ◆ The average monthly temperature in this climate ranges from 24°C to 27°C, with the least annual temperature range. The diurnal temperature range (difference between day and night temperatures) is significantly greater than the annual range.
- ◆ It is situated in the 'Belt of Calm' or Doldrums, known for its calm and windless conditions.
- ◆ Rainfall in this climate results from convection and features an annual average of about 250 cm. Approximately one-fourth of the total rainfall comes from cloud bursts, which are heavy rainfall events exceeding 100 mm or 3.97 in in 1 h.
- ◆ The climate is characterised by lush and multilayered vegetation, predominantly consisting of broad-leaved evergreen dense forests.
- ◆ In these forests, trees are densely packed, leading to intense competition for sunlight. This environment supports a greater diversity of plant and animal species compared to other climates.
- ◆ Most of the rain is intercepted by the forest canopy, gradually reaching the ground as aerial streamlets through leaves, branches and stems of trees. This results in maximum water infiltration.
- ◆ The presence of buttress roots helps prevent trees from falling over, given the nutrient-poor soil. Grass is relatively scarce, while epiphytes, plants growing on other plants, account for 40% of the biomass of all plants.
- ◆ The major occupation in this climate is the cultivation of tropical crops.
- ◆ Examples of regions with this climate include the Amazon basin, Congo basin and Indonesia.

Tropical Monsoon Climate

- ◆ The tropical monsoon climate is characterised by a complete seasonal reversal of winds, leading to distinct wet and dry seasons.
- ◆ Typically, the monsoon brings seasonal rainfall, primarily during summers. This seasonal rainfall pattern influences the vegetation, which is deciduous in nature.
- ◆ This climate receives an annual rainfall of approximately 200 cm.
- ◆ There are many places with a tropical monsoon climate, such as the West Indies, parts of the Amazon valley, Northern Australia, Southeastern Asia, and the African coast of Western Guinea.

Tropical Grasslands/Savanna Climate

- ◆ With an average annual temperature of about 23°C and an average annual rainfall of about 150 cm, this climate is described.
- ◆ It is also known as the Sudan Climate. It is bounded by tropical rainforests closer to the equator and trade wind hot deserts further towards the poles.
- ◆ The Savanna climate is primarily characterised by grasslands with trees and bushes strewn about that can resist drought during the dry season.
- ◆ The seasonal rainfall in this climate is primarily due to convectional ascent of air, often resulting in summer cloud bursts. There is a distinct dry season during the winter months.
- ◆ The trees in this climate tend to have longer roots and are fire-resistant.
- ◆ In South America, it is referred to as Llanos and Campos. This climate type is often known as the 'Big game country' due to the presence of a variety of herbivores and carnivores.

Tropical-Subtropical Hot Desert

- ◆ This climate type is found on the western edges of continents and is located in the trade wind belt.
- ◆ Two key factors contribute to the arid nature of these regions: (a) the western side of continents being home to cold ocean currents, leading to a desiccating effect and (b) the fact that trade winds are offshore on the western side of the continent because they have already released the moisture they picked up from water bodies on the eastern side.

- ◆ Notable regions with this climate include the Colorado Desert and Mexican Desert in North America, the Sahara and Kalahari in Africa, the Namib Desert on the southwestern coast of Africa, the Arabian Desert, Iranian Plateau and Thar Desert in Southwest Asia, the Atacama Desert in South America, and the Great Australian Desert in Australia.
- ◆ This climate zone features an average annual temperature of 38°C, with summer temperatures soaring to 40°C and winter temperatures at a more moderate 15°C.
- ◆ The average annual rainfall in this region ranges from approximately 25 to 40 cm, making it relatively arid. It exhibits the greatest diurnal temperature variations.
- ◆ Due to minimal cloud cover, this climate zone receives the highest levels of insolation (incoming solar radiation).
- ◆ Vegetation in this climate is xerophytic, adapted to thrive in arid conditions.
- ◆ Africa's Sahel region is a transitional semi-arid climate zone. It serves as a buffer zone between the Sudanian Savanna to the south and the Sahara Desert to the north.
- ◆ The Nubian Desert is situated in the eastern part of the Sahara Desert, extending between the Nile River and the Red Sea. It, too, experiences arid conditions.

List of Important Deserts

1. **Antarctica Desert (Cold)**
 - Location: Antarctica (covers the entire continent)
2. **Arctic Desert (Cold)**
 - Location: Arctic region (includes parts of Canada, Greenland, Russia and other northern regions)
3. **Sahara Desert**
 - Location: North Africa (covers parts of Algeria, Chad, Egypt, Libya, Mali, Mauritania, Morocco, Niger, Sudan, Tunisia and Western Sahara)
4. **Arabian Desert**
 - Location: Arabian Peninsula (includes parts of Saudi Arabia, Yemen, Oman, the UAE, Kuwait, Jordan and Iraq)
5. **Gobi Desert (Cold)**
 - Location: Northern China and southern Mongolia
6. **Kalahari Desert**
 - Location: Southern Africa (covers parts of Botswana, Namibia and South Africa)

(Continues)

7. **Patagonian Desert**
 - Location: Southern Argentina and Chile
8. **Kara Kum Desert**
 - Location: Central Asia (primarily in Turkmenistan)
9. **Thar Desert**
 - Location: Northwestern India and south-eastern Pakistan
10. **Sonoran Desert**
 - Location: Southwestern United States and northwestern Mexico
11. **Great Victoria Desert**
 - Location: Central and Western Australia
12. **Atacama Desert (Cold)**
 - Location: Northern Chile
13. **Chihuahuan Desert**
 - Location: North America (includes parts of the southwestern United States and northern Mexico)
14. **Great Basin Desert**
 - Location: Western United States
15. **Colorado Plateau Desert**
 - Location: Southwestern United States
16. **Great Sandy Desert**
 - Location: Australia
17. **Gibson Desert**
 - Location: Australia
18. **Simpson Desert**
 - Location: Central Australia
19. **Taklamakan Desert**
 - Location: Western China
20. **Dasht-e Kavir (Great Salt Desert)**
 - Location: Iran
21. **Kyzylkum Desert**
 - Location: Central Asia (primarily in Kazakhstan and Uzbekistan)
22. **Karakum Desert**
 - Location: Central Asia (primarily in Turkmenistan)
23. **Mojave Desert**
 - Location: USA

Middle Latitude Desert Climate

- ◆ Middle latitude desert climates are typically found between 35° and 50° North and South latitudes.
- ◆ Specific regions with this climate include the Taklamakan Desert (including the Tarim Basin), the Gobi Desert, Turkmenistan and Central Iran. In the Southern Hemisphere, a similar climate can be observed in Patagonia (Argentina and Chile).

- ◆ In contrast to hot deserts, these regions experience very cold winters due to their inland locations, with the Gobi Desert being the largest cold desert in the world.

Temperate Continental/Steppes

- ◆ The Temperate Continental or Steppe climate is situated in transition zones between hot deserts and more humid climates. It occupies the poleward margins of tropical and subtropical deserts.
- ◆ This climate is characterised by continental features with extreme temperature variations between summers and winters, although the Southern Hemisphere may have milder conditions.
- ◆ It is considered a semi-arid climate with an plenty of shrubs and grasses.
- ◆ These regions are known for commercial farming and herding, often referred to as the 'Bread Basket' or 'Granaries of the World'.
- ◆ The climate is known by different names depending on the region.

Grasslands	Country/Area
Prairies	North America
Pampas	Argentina and Uruguay
Veld	South Africa
Downs	Australia
Steppes	Eurasia
Canterbury	New Zealand
Puszta	Hungary
Manchurian	Russia

Warm Temperate Western Margin/Mediterranean Type

- ◆ Around the western coasts of continents between 30° and 45° North and South latitudes is where you can find the Warm Temperate Western Margin or Mediterranean Type climate. The Mediterranean Sea, Southern Europe, North Africa, the California coast, Central Chile, the Cape of Good Hope and Southwest Australia are among the places where it is observed.
- ◆ This climate results from the shifting of wind belts and is characterised by dry summers and humid winters.
- ◆ Dry summer conditions are due to off-shore trade winds that provide little rainfall.

- ◆ In contrast, winter sees cyclonic rainfall, mainly influenced by the westerlies.
- ◆ The average annual temperature in these regions is around 16°C, with winter temperatures at 10°C and summer temperatures at 25°C.
- ◆ The annual rainfall averages 40–60 cm.
- ◆ Notable products of these regions include olives, grapevines, cedar and citrus fruits, and they are also known for grain farming.
- ◆ The natural vegetation in Mediterranean Climate regions goes by different names, such as Chaparral (California), Maquis (Southern Europe), Mallee (Australia), Matorral (Chile) and Fynbos (South Africa).

Warm Temperate Eastern Margin/China Type

- ◆ The eastern coasts of continents between 25° and 45° North and South latitudes have this type of climate.
- ◆ Regions with this climate include China, the Southeastern USA, South Brazil, Eastern Argentina, Southeast Africa, Southeast Australia, and South Japan.
- ◆ It is considered the eastern counterpart of the Mediterranean climate.
- ◆ This climate features warm, moist summers and cool, dry winters, strongly influenced by marine conditions.

Cool Temperate Western Margin/British Type

- ◆ Cool Temperate Western Margin climates are located on the western sides of continents between 40° and 65° North and South latitudes.
- ◆ This climate is found in parts of Southern New Zealand, the west coast of Canada, South Chile and Northwest Europe, including the British Isles.
- ◆ Summers in these regions are moderate to cool, with temperatures averaging between 15°C and 18°C, while winters are mild, with temperatures ranging from 2°C to 10°C.
- ◆ The annual average temperature is approximately 10°C.
- ◆ Since westerly winds from the ocean blow throughout the year, there is no distinct dry season in these areas, where annual rainfall typically ranges from 75 to 100 cm. Most rainfall is caused by cyclonic activity.
- ◆ Chile, a country in South America, has hot desert, Mediterranean and cool temperate climates.

Cool Temperate Eastern Margin/Laurentian

- ◆ The eastern equivalent of the British Type is the Cool Temperate Eastern Margin climate type is found in two distinct regions: North-eastern North America (referred to as Laurentia) and the Asian coasts to the east (Northern China, Korea and Northern Japan included).
- ◆ Warm, rainy summers and cold, dry winters define this climate. The Asian coasts to the east (Northern China, Korea, and Northern Japan included).
- ◆ The convergence of warm and cold ocean currents near these regions plays a significant role in shaping this climate.

Temperate Cool Continental/Taiga

- ◆ Only the Northern Hemisphere, whose high latitude continents are widely dispersed east-west, has this type of climate. It is situated between the Tundra and Steppes Climate.
- ◆ The term 'Taiga' originates from the Russian word for 'pure' or 'untouched'. It speaks of snow forests made up of evergreen spruce, fir and pine trees, as well as other coniferous or boreal trees with needle-shaped leaves. Taiga extends east-west over two vast belts: from Norway to the Kamchatka Peninsula in Eurasia, and from Alaska to Newfoundland in North America.
- ◆ Taiga climates feature cool and brief summers with average temperatures around 10°C and extremely cold and lengthy winters with temperatures dropping below 0°C.
- ◆ These regions exhibit the highest annual temperature range, with some areas, such as Verkhoyansk, experiencing January temperatures as low as -50°C and an annual temperature range of 64°C.
- ◆ Annual precipitation in Taiga regions is typically less than 50 cm, and the soils are characterised by Podzol soils.
- ◆ Taiga forests are of great significance as they are the primary source of softwood used for various products such as paper, pulp, matches and furniture. These forests are also home to fur-bearing animals.

Tundra Climate

- ◆ Summers in the tundra climate are warm enough to melt the sparse snow cover or small bodies of water. This results in water-saturated land and the presence of marshes and swamps.

Isotherms and Land-Sea Contrast

- ◆ Isotherms, which are imaginary lines connecting places with equal temperatures, exhibit irregular patterns in the Northern Hemisphere due to the enhanced contrast between land and sea. The Northern Hemisphere, with a predominance of land over water, tends to be warmer.
- ◆ The thermal equator, represented by the Inter-tropical Convergence Zone (ITCZ), generally lies to the north of the geographical equator.

Influence of Warm Ocean Currents

- ◆ When passing through areas with warm ocean currents, isotherms shift poleward. For example, while the Kurishio Current and North Pacific Current combine with Westerlies in the Northern Pacific, the North Atlantic Drift and Gulf Stream interact with them in the Northern Atlantic.
- ◆ Warm ocean currents tend to drive temperature gradients low over the eastern edges of continents and high over the western edges, where cold ocean currents have a greater influence.

Mountain Influence

- ◆ Mountains also impact the horizontal distribution of temperature. For instance, the Rockies and the Andes act as barriers to the oceanic influence, preventing it from penetrating further into North and South America.

Pressure and Winds

Wind Formation

- ◆ Wind is the movement of air in a specific direction.
- ◆ The primary factor driving wind is differences in air pressure within the atmosphere.
- ◆ Naturally, air flows from high-pressure regions to low-pressure regions.

Pressure Gradient

- ◆ The term 'pressure gradient' refers to the difference in pressure between high and low points.

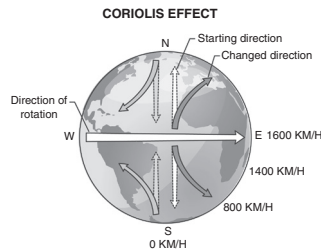


Figure 4.14 Coriolis effect

- ◆ The wind's direction is determined by the pressure gradient's direction.
- ◆ The wind will blow more quickly the steeper the pressure gradient.

Coriolis Force

- ◆ The rotation of the Earth produces an effect known as the Coriolis Force.
- ◆ It affects the wind's direction.
- ◆ Winds are deflected to the left in the Southern Hemisphere and to the right in the Northern Hemisphere.
- ◆ It is a consequence of Newton's First Law of Motion (Law of Inertia).
- ◆ This deflection effect is known as Ferrel's Law.
- ◆ The Coriolis force is missing at the equator and becomes stronger towards the poles.
- ◆ As a result, winds that would move perpendicular to lines of equal pressure (isobars) under the pressure gradient are deflected obliquely to them.

Atmospheric Pressure

Definition:

- ◆ The force that the weight of the air exerts on the surface of the Earth is known as atmospheric pressure.
- ◆ It is a fundamental climatic element with a significant impact on weather patterns.

Measurement:

- ◆ A barometer is a tool used to measure atmospheric pressure.

25. On June 21 every year, which of the following latitude(s) experience(s) a sunlight of more than 12 hours ?

1. Equator
2. Tropic of Cancer
3. Tropic of Capricorn
4. Arctic Circle

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) 3 and 4
- (d) 2 and 4

Ans: (d)

EXPLANATION:

Option 2 and 4 are correct. On 21st June, the Northern Hemisphere is tilted towards the sun. The rays of the sun fall directly on the Tropic of Cancer. As a result, these areas receive more heat. Sunlight of more than 12 hours is received at tropic of cancer. The North Pole is inclined towards the sun and the places beyond the Arctic Circle experience continuous daylight for about six months. Since a large portion of the Northern Hemisphere is getting light from the sun, it is summer in the regions north of the equator. The longest day and the shortest night at these places occur on 21st June.

Source:

<https://ncert.nic.in/ncerts/l/kegy209.pdf>
<https://ncert.nic.in/textbook/pdf/fess203.pdf>

26. One of the following regions has the world's largest tropical peatland, which holds about three years worth of global carbon emissions from fossil fuels; and the possible destruction of which can exert detrimental effect on the global climate. Which one of the following denotes that region ?
- | | |
|------------------|---------------------------|
| (a) Amazon Basin | (b) Congo Basin |
| (c) Kikori Basin | (d) Rio de la Plata Basin |

Ans: (b)

EXPLANATION:

The Congo Basin is home to the world's largest tropical peatlands. The peat swamp forest of the Congo Basin stores around 29 billion tons of carbon – approximately equivalent to three years' worth of global greenhouse gas emissions – while the Basin as a whole absorbs nearly 1.5 billion tons of carbon dioxide a year. The Basin stretches across six countries- Cameroon, Central African Republic, Democratic Republic of the Congo, Congo, Equatorial Guinea and Gabon. The Congo Basin is one of the world's last regions that absorbs more carbon than it emits. Its possible destruction can have detrimental effect on the global climate .

Source:

<https://www.unep.org/news-and-stories/story/critical-ecosystems-congo-basin-peatlands#:~:text=The%20peat%20swamp%20forest%20of,of%20carbon%20dioxide%20a%20year%20>

27. With reference to perfluoroalkyl and polyfluoroalkyl substances (PFAS) that are used in making many consumer products, consider the following statements
1. PFAS are found to be widespread in drinking water, food and food packaging materials.
 2. PFAS are not easily degraded in the environment.
 3. Persistent exposure to PFAS can lead to bioaccumulation in animal bodies.

Which of the statements given above are correct ?

- | | |
|------------------|------------------|
| (a) 1 and 2 only | (b) 2 and 3 only |
| (c) 1 and 3 only | (d) 1, 2 and 3 |

Ans: (d)

EXPLANATION:

- Statement 1 is correct. Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are synthetic chemicals that are widespread in the environment, including drinking water, food, and food packaging materials.
- Statement 2 is correct. Chemically, individual PFAS can be very different. However, all have a carbon-fluorine bond, which is very strong and therefore, they do not degrade easily.
- Statement 3 is correct. Persistent exposure to PFAS (per- and polyfluoroalkyl substances) leads to bioaccumulation in animals due to their chemical stability and widespread environmental presence.

Source:

<https://www.fda.gov/food/environmental-contaminants-food/and-polyfluoroalkyl-substances-pfas>
<https://www.agilent.com/en/solutions/food-beverage/food-safety/pfas-food-beverages-packaging>
<https://enveurope.springeropen.com/articles/10.1186/s12302-023-00721-8#:~:text=PFAS%20can%20accumulate%20in%20aquatic,liver%20and%20kidney%20%5B136%5D>

28. Consider the following :
- | | |
|--------------------|---------------|
| 1. Carabid beetles | 2. Centipedes |
| 3. Flies | 4. Termites |
| 5. Wasps | |

Parasitoid species are found in how many of the above kind of organisms ?

- | | |
|---------------|----------------|
| (a) Only two | (b) Only three |
| (c) Only four | (d) All five |

Ans: (b)

EXPLANATION :

- A parasitoid is an organism that has young that develop on or within another organism (the host), eventually killing it. Parasitoids have characteristics of both predators and parasites.
- Option 1, 3 and 5 are correct. Parasitoids include species of wasps, flies (e.g. tachinid flies), carbid beetles and worms (e.g. gordian worms).
- Option 2 is incorrect. Some Centipedes are predators, but they are not parasitoids.
- Option 4 is incorrect. Unlike most insects, termites have no known parasitoids.

Source:

<https://australian.museum/learn/animals/insects/predators-parasites-and-parasitoids/>
<https://zoo-web02.zoo.ox.ac.uk/group/west/pdf/West-Para-2001.pdf>
https://link.springer.com/referenceworkentry/10.1007/978-1-4020-6359-6_492#:~:text=Several%20genera%20of%20carabid%20beetles,in%20the%20Diptera%20and%20Hymenoptera

29. Consider the following plants:

1. Groundnut
3. Soybean

2. Horse-gram

How many of the above belong to the pea family?

- | | |
|---------------|--------------|
| (a) Only one | (b) Only two |
| (c) All three | (d) None |

Ans: (c)

EXPLANATION:

- The Fabaceae or Leguminosae, commonly known as the legume, pea, or bean family, are a large and agriculturally important family of flowering plants.
- Option 1 is correct. The ground nut belongs to the pea and bean family and is a legume. The groundnut is the only nut that grows below the earth.
- Option 2 is correct. Horse gram belongs to family Fabaceae or pea is a potential grain legume having excellent nutritional and remedial properties with better climate resilience to adapt harsh environmental conditions.
- Option 3 is correct. Soybean is a flowering plant (angiosperm) and is a dicot (eudicot), in the Fabaceae, the pea family.

Source:

https://agriexchange.apeda.gov.in/product_profile/prd_profile.aspx?categorycode=0501#:~:text=The%20groundnut%20belongs%20to%20the,in%20height.
<https://www.cabidigitallibrary.org/doi/pdf/10.5555/20153340308>

<https://milnepublishing.geneseo.edu/botany/chapter/soybeans-and-other-beans/#:~:text=Soybean%20is%20a%20flowering%20plant,species%20that%20are%20important%20ecologically.>

30. Consider the following statements :

Statement-I : The Indian Flying Fox is placed under the “vermin” category in the Wild Life (Protection) Act, 1972.

Statement-II : The Indian Flying Fox feeds on the blood of other animals.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (c)

EXPLANATION:

- Statement I is correct. The Indian flying fox (*Pteropus giganteus*) is generally considered a vermin as they raid orchards. The Indian flying fox comes under schedule II of WPA 1972. As per Section 62 of Act Central Government may, by notification, declare any wild animal [specified in Schedule II] to be vermin for any area and for such period as may be specified for any period of time specified in the Notification.
- Statement II is incorrect. Indian Flying Fox also called the Great Indian Fruit Bat, as it eats fruits, feeding on the juice. It helps in seed dispersion and pollination, making them an integral part of the ecosystem.

Source:

<https://www.indiacode.nic.in/bitstream/123456789/1726/1/a1972-53.pdf>

<https://www.thehindu.com/sci-tech/science/flying-fox-bats-for-vigilance-while-roosting/article67184575.ece>

31. Consider the following statements :

Statement-I : The atmosphere is heated more by incoming solar radiation than by terrestrial radiation.

Statement-II: Carbon dioxide and other greenhouse gases in the atmosphere are good absorbers of long wave radiation.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (d)

EXPLANATION:

- Statement I is incorrect. Consider that the isolation received at the top of the atmosphere is 100 per cent. While passing through the atmosphere some amount of energy is reflected, scattered and absorbed. Only the remaining part reaches the earth's surface. Roughly 35 units are reflected back to space even before reaching the earth's surface. Of these, 27 units are reflected back from the top of the clouds and 2 units from the snow and ice-covered areas of the earth. The reflected amount of radiation is called the albedo of the earth.
- The remaining 65 units are absorbed, 14 units within the atmosphere and 51 units by the earth's surface. The earth radiates back 51 units in the form of terrestrial radiation. Of these, 17 units are radiated to space directly and the remaining 34 units are absorbed by the atmosphere. Thus, the atmosphere is heated more by terrestrial radiation than by incoming solar radiation.
- Statement II is correct. The long wave radiation is absorbed by atmospheric gases particularly by carbon dioxide and the other greenhouse gases as they are good absorbers of long wave radiation.

Source:

NCERT – Fundamentals of Physical Geography – Chapter: Solar Radiation, Heat Balance and Temperature
<https://ncert.nic.in/ncerts/l/kegy209.pdf>

Reference in Lakshya -

A Compendium of General Studies:

4-40
Lakshya—A Compendium of General Studies

Dust Particles:

- ◆ Dust particles play a role in the colours observed at sunrise and sunset, as well as in the duration of dawn, dusk and twilight.
- ◆ Dust particles are responsible for the orange and red colours seen at sunset and sunrise.
- ◆ The various phases of twilight are caused by dust particles.
- ◆ The daytime sky's blue hue is caused by dust particles scattering selectively.
- ◆ Certain dust particles can easily absorb moisture from the air due to their hygroscopic nature.
- ◆ These hygroscopic dust particles serve as condensation nuclei, which aid in the development of hailstones, clouds and fog.

Insolation and Heat Budget

Insolation (Incoming Solar Radiation)

- ◆ Insolation is a contraction of 'Incoming Solar Radiation' and refers to the energy that the Sun emits onto the surface of the Earth.
- ◆ It is the primary source of heat in the atmosphere.

Albedo

- ◆ Some of the energy that is received by the Earth's surface is reflected.
- ◆ Albedo is the percentage of solar radiation that is reflected off the surface.

Distribution of Insolation

- ◆ Insolation is generally greatest close to the tropics, marginally lower at the equator, and lowest at the poles.

Heat Budget (Heat Balance)

- ◆ Despite continuous energy input from the Sun, the temperature of the Earth remains relatively constant, with long-term climatic changes being the only variations.
- ◆ The atmosphere loses heat equivalent to the gain through insolation, maintaining this temperature balance.
- ◆ This mechanism is known as the Heat Budget or Heat Balance.

Energy Distribution

- ◆ Suppose that out of 100 units of energy that reach the top of Earth's atmosphere, 14 are directly absorbed by the atmosphere and 35 are reflected back into space.
- ◆ When the remaining 51 units hit the surface of the Earth, they are absorbed and cause the surface to warm.
- ◆ Terrestrial radiation is the name for the long waves of energy that are emitted by the heated Earth's surface.
- ◆ About 34 of the 51 units released by the surface are absorbed by the atmosphere, primarily in the form of carbon dioxide and water vapour.
- ◆ The final seventeen units take off for space.
- ◆ A total of $14 + 34 = 48$ units are received by the atmosphere, which is then radiated back into space.
- ◆ Thirty-five units of energy are lost as radiation on land, 17 units are reflected by the atmosphere, and 48 units are lost directly to space.
- ◆ As a result, there is no net energy gain or loss at the surface of the Earth.

Latitudinal Variations

- ◆ There are latitudinal variations in the radiation balance of the Earth and its atmosphere.
- ◆ Advection is the process by which heat and energy are moved from lower latitudes to higher latitudes by winds and ocean currents.

Short waves of solar radiation, mainly visible light and wavelengths below visible light, of which ultra-violet radiation makes up a sizable fraction, are sent to Earth by the Sun. This solar radiation is of electromagnetic nature. During the daytime, the Earth's surface absorbs this short-wave radiation. At night, the Earth radiates the heat it has absorbed back into space as long-wave radiation, primarily in the form of infrared radiation.

Transfer of Heat Energy

- ◆ There are three ways that solar radiation heat energy reaches Earth.

Radiation

- ◆ Heat is transferred from one body to another through radiation, which happens when there is no physical contact or movement.

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- ◆ It happens in relatively empty spaces, like when heat travels through space vacuum from the Sun to the Earth.

Conduction

- ◆ The movement of heat through matter due to molecular activity is called conduction.
- ◆ This is how heat is conducted by materials such as iron and other metals.
- ◆ Lighter substances, like air, are poor heat conductors, whereas denser materials, like water, are good ones.

Convection

- ◆ Convection is the movement of matter or substance from one location to another that results in the transfer of heat energy.
- ◆ Heat transfer occurs in the atmosphere and oceans due to the prevalence of convection cycles in these environments.

Land-Sea Differential

- ◆ The difference between the albedo of land and oceans and other bodies of water is known as the 'land-sea differential'.
- ◆ Land typically has a higher albedo than water, meaning it reflects more solar radiation.
- ◆ For example, snow-covered areas can reflect 70%–90% of incoming solar radiation, contributing to heat differences on the Earth's surface.

Since albedo controls how much incoming radiation is reflected, it is important to understand how the Earth will react to climate change. The kinds of vegetation and surface cover that are present affect this albedo.

Surface	Typical Albedo
Fresh Snow	0.8–0.9
Old/Melting Snow	0.4–0.8
Desert Sand	0.25–0.40
Grassland	0.15–0.25
Naked Soil	0.17
Deciduous Trees	0.15–0.18
Coniferous Forest	0.08–0.15
Open Ocean	0.07–0.10

- ◆ The quantity of incoming radiation that the Earth's surface reflects, or albedo, has a major impact on how the planet responds to climate change. The albedo varies depending on the type of vegetation and surface cover.
- ◆ Sunlight penetrates water to a greater depth, up to 20 m, in comparison to land, where it only penetrates up to 1 m. Consequently, land heats up or cools down more rapidly than oceans. Oceans, with their continuous convection cycles, facilitate heat exchange between layers, which contributes to minimal daily and yearly temperature fluctuations.
- ◆ Water has a specific heat 2.5 times higher than that of land, which means the temperature changes of water are slower. Even at the same latitude, temperatures over oceans and landmasses can differ due to the differential heating of land and water.

General Temperature Distribution

Temperature Distribution

- ◆ Because of the high insolation (solar radiation), the tropics and sub-tropics have the highest temperatures. In contrast, polar and sub-polar areas record the lowest temperatures.

Diurnal and Annual Temperature Ranges

- ◆ Inland areas of continents experience the highest diurnal and annual temperature ranges, primarily due to continentality, which results from the lack of the moderating influence of oceans.
- ◆ Oceans have the least diurnal and annual temperature ranges, thanks to the water's high specific heat and water mixing, which maintain temperature stability.

Temperature Gradients

- ◆ In the tropical zone, where the Sun's apparent path varies significantly throughout the year, low-temperature gradients are typical, while high-temperature gradients are observed over middle and higher latitudes.
- ◆ Warm ocean currents tend to drive temperature gradients low over the eastern edges of continents and high over the western edges, where cold ocean currents have a greater influence.

32. Consider the following statements :

Statement-I: Thickness of the troposphere at the equator is much greater as compared to poles.

Statement-II: At the equator, heat is transported to great heights by strong convective currents.

Which one of the following is correct in respect of the above statements ?

- Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- Both Statement-I and Statement-II are correct but Statement-II does not explain Statement-I
- Statement-I is correct, but Statement-II is incorrect
- Statement-I is incorrect, but Statement-II is correct

Ans: (a)

EXPLANATION:

- Statement I is correct. The thickness of the troposphere varies with latitude. It is thickest at the equator and thinnest at the poles. This variation is due to the differences in temperature and, consequently, the density of the air at different latitudes. Warm air is less dense and causes the troposphere to expand, making it thicker at the equator.
- Statement II is correct. At the equator, the intense solar heating causes strong convective currents. These currents transport heat to great heights, contributing to the greater thickness of the troposphere in this region.
- Statement II is the correct explanation for Statement I. The strong convective currents at the equator are the primary reason for the increased thickness of the troposphere compared to the poles.

Source:

NCERT – Fundamentals of Physical Geography – Chapter: Climate
<https://www.ncert.nic.in/ncerts/l/kegy208.pdf>

- ◆ Without the atmosphere, there would be substantial temperature variations.

Kármán Line

The Kármán line marks the boundary where space begins, located at an altitude of 100 km. It serves as the border between Earth's atmosphere and outer space.

Atmospheric Composition (Up to 50 km): The atmosphere primarily consists of:

- ◆ Nitrogen: 78.09%
- ◆ Oxygen: 20.95%
- ◆ Argon: 0.93%
- ◆ Carbon dioxide: 0.03%
- ◆ Other gases present include hydrogen, neon, helium, ozone and more.
- ◆ Carbon dioxide plays a crucial role in heat absorption from both the Sun and the Earth. High carbon dioxide levels lead to the greenhouse effect.
- ◆ Average Earth Temperature: The Earth's average temperature is approximately **14°C**.

Permanent Gases of the Atmosphere

Constituent	Formula	Percentage by Volume
Nitrogen	N ₂	78.08
Oxygen	O ₂	20.95
Argon	Ar	0.93
Carbon dioxide	CO ₂	0.036
Neon	Ne	0.002
Helium	He	0.0005
Krypto	Kr	0.001
Xenon	Xe	0.00009
Hydrogen	H ₂	0.00005

Role of Water Vapour and Carbon Dioxide

Water vapour is responsible for condensation and precipitation and absorbs and reduces solar and terrestrial heat reaching the surface of the Earth.

The Atmosphere and Its Layers

Troposphere

- ◆ The closest layer to the Earth's surface.
- ◆ Varies in thickness, from 8 km at the poles to 16 km at the equator.

- ◆ All weather phenomena occur here, with high density, water vapour, moisture and dust.
- ◆ Dust particles influence twilight and the red colours of sunlight and sunset.
- ◆ Exhibits a normal lapse rate of temperature, with a 1°C drop per 165 m, or 6.4°C per km.
- ◆ The tropopause marks its upper boundary, with temperatures dropping to -45°C at 8 km and -80°C at 16 km.

Stratosphere

- ◆ Extends from 16 to 50 km above the Earth's surface.
- ◆ Temperature ceases to decrease with height in this layer.
- ◆ Weather phenomena are minimal due to low water vapour and dust content.
- ◆ Contains the ozone layer (25–30 km from the Earth's surface) that absorbs harmful ultraviolet rays.
- ◆ Ozone depletion is a concern due to substances like CFCs and nitrogen oxide radicals.
- ◆ The stratopause represents the boundary with a temperature of 0°C.

Mesosphere

- ◆ Found at altitudes ranging from approximately 31 miles (50 km) to 53 miles (85 km) above the Earth's surface.
- ◆ Temperatures decrease with altitude and can reach as low as -130°C (-200°F).
- ◆ This layer is where meteors burn up, and it features phenomena such as noctilucent clouds.
- ◆ It absorbs high-energy ultraviolet radiation and protects Earth from harmful solar and cosmic radiation.
- ◆ The mesosphere sits as a transition zone between weather and space, influenced by both lower atmospheric layers and the upper thermosphere.

Ionosphere or Thermosphere

- ◆ Extends up to around 500–600 km above the Earth's surface.
- ◆ Named for its electrically charged particles (ions) that enable radio wave reflection, facilitating communication.
- ◆ Offers protection against harmful radiation and prevents meteorites from reaching Earth.

33. Consider the following :
1. Pyroclastic debris
 3. Nitrogen compounds

How many of the above are products of volcanic eruptions?

- (a) Only one
- (c) Only three

2. Ash and dust
4. Sulphur compounds

- (b) Only two
- (d) All four

Ans: (d)

EXPLANATION:

A volcano is a place where gases, ashes and/or molten rock material – lava – escape to the ground. The material that reaches the ground includes lava flows, pyroclastic debris, volcanic bombs, ash and dust and gases such as nitrogen compounds, Sulphur compounds and minor amounts of Chlorene, hydrogen and argon.

Source:

NCERT – Fundamentals of Physical Geography – Chapter: Interiors of the Earth

Source:

NCERT – Fundamentals of Physical Geography – Chapter : Solar Radiation, Heat Balance and Temperature
<https://ncert.nic.in/ncerts/l/kegy209.pdf>

Reference in Lakshya -

A Compendium of General Studies:

4-42 Lakshya—A Compendium of General Studies

Isotherms and Land-Sea Contrast

- ◆ Isotherms, which are imaginary lines connecting places with equal temperatures, exhibit irregular patterns in the Northern Hemisphere due to the enhanced contrast between land and sea. The Northern Hemisphere, with a predominance of land over water, tends to be warmer.
- ◆ The thermal equator, represented by the Inter-tropical Convergence Zone (ITCZ), generally lies to the north of the geographical equator.

Influence of Warm Ocean Currents

- ◆ When passing through areas with warm ocean currents, isotherms shift poleward. For example, while the Kurishio Current and North Pacific Current combine with Westerlies in the Northern Pacific, the North Atlantic Drift and Gulf Stream interact with them in the Northern Atlantic.
- ◆ Warm ocean currents tend to drive temperature gradients low over the eastern edges of continents and high over the western edges, where cold ocean currents have a greater influence.

Mountain Influence

- ◆ Mountains also impact the horizontal distribution of temperature. For instance, the Rockies and the Andes act as barriers to the oceanic influence, preventing it from penetrating further into North and South America.

Pressure and Winds

Wind Formation

- ◆ Wind is the movement of air in a specific direction.
- ◆ The primary factor driving wind is differences in air pressure within the atmosphere.
- ◆ Naturally, air flows from high-pressure regions to low-pressure regions.

Pressure Gradient

- ◆ The term 'pressure gradient' refers to the difference in pressure between high and low points.

CORIOLIS EFFECT

Figure 4.14 Coriolis effect

- ◆ The wind's direction is determined by the pressure gradient's direction.
- ◆ The wind will blow more quickly the steeper the pressure gradient.

Coriolis Force

- ◆ The rotation of the Earth produces an effect known as the Coriolis Force.
- ◆ It affects the wind's direction.
- ◆ Winds are deflected to the left in the Southern Hemisphere and to the right in the Northern Hemisphere.
- ◆ It is a consequence of Newton's First Law of Motion (Law of Inertia).
- ◆ This deflection effect is known as Ferrel's Law.
- ◆ The Coriolis force is missing at the equator and becomes stronger towards the poles.
- ◆ As a result, winds that would move perpendicular to lines of equal pressure (isobars) under the pressure gradient are deflected obliquely to them.

Atmospheric Pressure

Definition:

- ◆ The force that the weight of the air exerts on the surface of the Earth is known as atmospheric pressure.
- ◆ It is a fundamental climatic element with a significant impact on weather patterns.

Measurement:

- ◆ A barometer is a tool used to measure atmospheric pressure.

35. Which of the following countries are well known as the two largest cocoa producers in the world?
- | | |
|-----------------------------|-------------------------------|
| (a) Algeria and Morocco | (b) Botswana and Namibia |
| (c) Cote d'Ivoire and Ghana | (d) Madagascar and Mozambique |

Ans: (c)

EXPLANATION:

Cocoa, the key ingredient in chocolate production, holds significant economic importance for countries around the world. Worldwide cocoa production is predominantly centred in Africa, encompassing 60% of global output. Key factors influencing production include climate, soil type, and weather conditions in these regions.

Côte d'Ivoire, with the annual cocoa production of 22,00,000 tons, stands as the largest cocoa producer in the world, followed by Ghana, Indonesia, Nigeria and Ecuador.

Source:

<https://www.newindianexpress.com/states/kerala/2024/Jan/17/kerala-cocoa-farmers-cheer-as-prices-hit-44-year-high>
<https://www.worldatlas.com/industries/the-top-cocoa-producing-countries-in-the-world.html>

36. With reference to the Himalayan rivers joining the Ganga downstream of Prayagraj from West to East, which one of the following
- (a) Ghaghara - Gomati - Gandak - Kosi
(b) Gomati - Ghaghara - Gandak - Kosi
(c) Ghaghara - Gomati - Kosi - Gandak
(d) Gomati - Ghaghara - Kosi - Gandak

Ans: (b)

EXPLANATION:

The correct sequence of Himalayan rivers joining the Ganga downstream of Prayagraj from West to East is Gomati – Ghaghara – Gandak – Kosi

Source:

<https://ncert.nic.in/textbook/pdf/kegy103.pdf>

Reference in Lakshya -

A Compendium of General Studies:

Geography 4-87

- *Characteristics:* Relatively smaller basin size, more stable flow patterns, and a significant role in regional agriculture.

Impact on Landscape and Culture

- ◆ **Himalayan Rivers:**
 - *Ganges-Brahmaputra Delta:* Formation of the world's largest delta in the Bay of Bengal, impacting the landscape and supporting a dense population.
 - *Cultural Significance:* These rivers hold immense cultural and religious importance in the lives of the people residing along their banks.
- ◆ **Peninsular Rivers:**
 - *Agricultural Backbone:* The rivers of the Deccan Plateau contribute significantly to agriculture, acting as lifelines for irrigation and sustenance.
 - *Geographical Diversity:* Varied landscapes, including plateaus, hills and coastal plains, shaped by the peninsular rivers.

Introduction to Himalayan River System

The Himalayan river system is a complex network of rivers originating from the Himalayan mountain range. It can be broadly categorised into three major river systems:

The Indus System

- ◆ *Origin:* India's westernmost Himalayan river is the Indus, also referred to as Sindhu.
- ◆ *Source:* In the Tibetan area near Mansarovar Lake, on a glacier close to Bokhar Chu.
- ◆ *Tibetan Alias:* Referred to in Tibet as 'Singi Khamban', or Lion's Mouth.
- ◆ In Jammu and Kashmir, the Himalayan Tributaries are Zaskar, Dras, Gortang, Shyok, Shigar, Nubra, Gilgit and other places.
- ◆ *Major Tributaries:* Jhelum, Chenab, Ravi, Beas and Sutlej are significant contributors to the Indus at various locations.

The Ganga System

India's second-largest drainage system is the Ganga System.

Important characteristics

Source: The Gangotri glacier, located in the Uttarkashi district of Uttarakhand, close to Gaumukh (3,900 m), is the source of the Ganga system. When it meets the Alaknanda at Dev Prayag, it is originally called the Bhagirathi and is subsequently referred to as the Ganga.

- ◆ **Alaknanda Tributaries:**
 - The meeting point of the Dhauli and the Vishnu Ganga at Joshimath or Vishnu Prayag forms the Alaknanda.
 - Other tributaries include the **Pindar** (joining at **Karna Prayag**), **Mandakini** or Kali Ganga (meeting at **Rudra Prayag**) and **Nandakini** (joining at **Nand Prayag**).
 - Panch Prayag is the collective name for Dev Prayag, Karn Prayag, Nand Prayag, Rudra Prayag and Vishnu Prayag.
 - Ramganga, Gomti, Kali or Sarda, Gandak, Kosi and the Ghaghra are the left-bank tributaries.
 - Tributaries on the right bank: Yamuna and Son. At Allahabad, the Yamuna joins the Ganga.
- ◆ **Significant Distributary:** Hooghly, flowing through Kolkata.
- ◆ **Flood-Prone Rivers:** Because of their tendency to cause floods in these areas, Kosi is known as the 'Sorrow of Bihar' and Damodar as the 'Sorrow of Bengal'.
- ◆ Mahananda is the easternmost(rightmost) tributary of Ganga.
- ◆ **Yamuna Confluence:** Yamuna, a right bank tributary, joins the Ganga at **Prayagraj (Allahabad)**.

Introduction to the Brahmaputra River System

- ◆ The Brahmaputra stands as one of the largest rivers globally, impacting the geography and life across multiple countries.
- ◆ **Naming and Course:**
 - *Tibet:* Known as Tsangpo in Tibet.
 - *Arunachal Pradesh:* Referred to as Dihang or Siang in Arunachal Pradesh.
 - *Assam:* Flows as the Brahmaputra through Assam.
 - *Bangladesh:* Known as Jamuna in Bangladesh.
- ◆ **Riverine Islands and Geographic Features:**
 - *Riverine Islands:* The Brahmaputra forms numerous riverine islands along its course, contributing to the region's diverse ecosystems.
 - *Majuli:* Home to the largest riverine island globally, Majuli is a prominent feature of the Brahmaputra's course.

37. Consider the following statements :
- Statement-I : Rainfall is one of the reasons for weathering of rocks.
Statement-II: Rain water contains carbon dioxide in solution.
Statement-III: Rain water contains atmospheric oxygen.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-II and Statement-III are correct and both of them explain Statement-I
(b) Both Statement-II and Statement-III are correct, but only one of them explains Statement-I
(c) Only one of the Statements II and III is correct and that explains Statement-I
(d) Neither Statement-II nor Statement-III is correct

Ans: (a)

EXPLANATION:

- Weathering is the action of elements of weather and climate over earth materials. There are three major groups of weathering processes: (i) chemical; (ii) physical or mechanical; (iii) biological.
- Statement I is correct: The chemical weathering processes act on the rocks to decompose, dissolve or reduce them to a fine clastic state through chemical reactions by oxygen, surface and/or soil water and other acids. Water and air (oxygen and carbon dioxide) along with heat must be present to speed up all chemical reactions. Water from rainfall is one of the reasons for weathering rocks.
- Statement II is correct: Normal rain has a pH of approximately 5.6, making it slightly acidic due to the dissolution of carbon dioxide (CO₂), which forms weak carbonic acid. Thus, Statement II is correct and explains statement I.
- Statement III is correct: During rain, oxygen concentrations in rain drops tend to rise as rain drops saturate with oxygen as they fall. Thus, Rainwater contains atmospheric oxygen.
- Therefore, the rainfall supplies water, CO₂, and oxygen facilitating the chemical weathering of rocks.
- Statement II and Statement III are both correct and explain statement I.

Source:

<https://ncert.nic.in/ncerts/l/kegy206.pdf>
<https://www.epa.gov/caddis/dissolved-oxygen>

Reference in Lakshya -

A Compendium of General Studies:

Geography 4-33

Caucasus Mountains

- Location: Europe and Asia (Russia, Georgia, Armenia)
- Highest Peak: Mount Elbrus at 5,642 m (18,510 ft)

Alaska

- Located in Alaska, USA
- Highest Peak: Mount Denali (6194 m)

Weathering and Erosion

Weathering

- ◆ **Definition:** The breakdown and disintegration of rocks is known as weathering.
- ◆ **Nature:** *In situ* weathering, or the breaking or crumbling of rocks in their original location, is the process through which weathering takes place.

Mechanical or Physical Weathering

Characteristics

- ◆ Rocks weather into ever-tinier pieces during this kind of weathering.
- ◆ Throughout this process, the rocks' chemical composition does not change.
- ◆ Mechanical weathering is prominent in regions with high diurnal temperature variations, especially in hot and dry/moist climates.

Mechanisms

Frost Action

When water fills the pores, fissures and crevices in rocks and then freezes, this mechanism takes place in cold climates. Water expands by 9% when it turns into ice, exerting pressure on the rocks, leading to their rupture and fragmentation.

Thermal Expansion and Contraction

In hot desert regions, diurnal temperature fluctuations cause the surface rocks' expansion and contraction, which causes them to break up into smaller pieces.

Exfoliation

This process, called 'expansion by unloading', happens when large igneous bodies become visible as a result of erosion removing the surrounding rocks. As these bodies reach the surface, they slightly expand in volume, causing the thick outer layers to break away from the parent mass.

Chemical Weathering

Characteristics

- ◆ Chemical weathering alters the fundamental properties and molecular structure of rocks.
- ◆ Because of the presence of water, this type of weathering is more effective in areas with hot, humid climates.
- ◆ **Solution:** Rocks can be completely dissolved in this process, leading to the formation of landscapes such as Karst topography. Minerals such as chalk, gypsum, salt and limestone dissolve in water.
- ◆ **Oxidation:** Oxidation occurs when dissolved oxygen in water comes into contact with the surfaces of minerals, particularly iron-containing rocks.
- ◆ **Hydration:** Numerous minerals that form rocks absorb water, increasing their volume and causing chemical changes, ultimately resulting in the formation of softer and more voluminous new minerals.
- ◆ **Carbonation:** Carbonic acid is created when water and carbon dioxide mix, dissolving a number of mineral elements and weakening the rock and causing it to break into pieces.
- ◆ **Note:** Hydration is a weathering process that falls under both mechanical and chemical categories. It involves absorbing water leading to swelling and stress within the rock, forcing the grains apart as the constituents expand. This process results in granular disintegration.

Biological Weathering

Plants, animals and even human activities contribute to weathering. Human activities, such as cultivation, mining and transportation, are significant agents of weathering. Plants

contribute by allowing their roots to pierce through rocks, loosening joints and acting as a mild acid on rocks when rainwater and decomposing organic matter are combined, further contributing to the weathering process.

Erosion

Definition: Erosion is the process by which the Earth's surface ages and higher areas lose their rock content (*ex-situ erosion*).

Agents of Erosion

- ◆ Mobile agents, such as streams, glaciers, winds, waves, and subsurface water, are responsible for erosion.
- ◆ Each of these substances works to transfer the material that has been eroded and to remove rocks from higher areas to lower regions.
- ◆ **Outcome:** The result of erosion is the transformation of the Earth's surface. This process converts uneven terrain into more even landscapes.
- ◆ **Resulting Features:** The activities of erosion and deposition lead to the formation of various landform features, contributing to the Earth's geological diversity.

Stages of a River

Upper Course (Youth)

- ◆ This stage is characterised by steep slopes in mountainous areas, leading to rapid water flow. Swift-flowing water enables deep riverbed excavation and the transportation of heavy boulders and pebbles.
- ◆ Erosion and transportation are the primary activities in this stage.
- ◆ The river has a deep and narrow channel with sections of hard and soft rocks, resulting in a rugged course with falls, cataracts and rapids.
- ◆ In specific conditions, like when the river flows through very hard rocks, it creates steep, almost vertical sides known as gorges.
- ◆ In desert regions, deep riverbeds with vertical sides form, resulting in I-shaped valleys. A well-known example is the Grand Canyon.

Middle Course (Maturity)

- ◆ This stage begins as the river leaves mountainous terrain and enters a plain, featuring a gentler slope.

- ◆ Slower current velocity and increased water volume due to multiple tributaries characterise this stage.
- ◆ Erosion primarily occurs along the riverbanks, resulting in lateral erosion and a widening river.
- ◆ As the river flows towards the lower plain, the slope further decreases, and the current speed reduces significantly.
- ◆ Sediments carried during floods are deposited in this area, often causing blockages in the river's channel.
- ◆ Winding channels, called meanders, develop, with erosion on the concave sides and sediment deposition on the convex sides.
- ◆ These meanders may be eventually cut off to form ox-bow lakes.
- ◆ Flood plains are created as silt accumulates in low-lying areas. Terraces along the river represent remnants of former flood plains.
- ◆ At the foot of the mountains, materials carried from the upper course form alluvial fans and piedmont plains.
- ◆ A peneplain, a near-level plain with low-lying residual hills, may be the result of extensive erosion.

Lower Course (Old Age)

- ◆ This stage is close to the river mouth, where the current slows considerably and the slope is gentle.
- ◆ Deposition becomes the dominant activity, causing the river channel to frequently block.
- ◆ Branch channels, known as distributaries, develop at the mouth, giving the river a braided appearance.
- ◆ Sediments carried by the river are deposited at the mouth, forming triangular landforms known as deltas.
- ◆ Under constant tidal waves and sea currents, a delta may not form, resulting in an open river mouth called an estuary.

Drainage Patterns

Drainage patterns refer to the arrangement or layout of natural watercourses like rivers, streams and creeks on the surface of the Earth. These patterns are shaped by various geological and environmental factors. Drainage patterns can be categorised into different types, and here are some common ones with examples:

38. Consider the following countries :

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Finland 3. Norway | <ol style="list-style-type: none"> 2. Germany 4. Russia |
|---|---|

How many of the above countries have a border with the North Sea?

- | | |
|--|--|
| <ol style="list-style-type: none"> (a) Only one (c) Only three | <ol style="list-style-type: none"> (b) Only two (d) All four |
|--|--|

Ans: (b)

EXPLANATION:

The North Sea is the sea surrounded by Norway, Scotland, England, France, Belgium, the Netherlands, Germany, and Denmark. (Finland and Russia do not share borders with North Sea).

Source:

<https://www.worldatlas.com/seas/north-sea.html>

39. Consider the following information:

	Waterfall	Regum	River
1.	Dhuandhar	Malwa	Narmada
2.	Hundru	Chota Nagpur	Subarnarekha
3.	Gersoppa	Western Ghats	Netravati

In how many of the above rows is the given information correctly matched?

- (a) Only one (b) Only two
(c) All three (d) None

Ans: (a)

EXPLANATION:

- Row 1 is incorrect: The Narmada River originates from the western flank of the Amarkantak plateau and flows through a rift valley, bordered by the Satpura range to the south and the Vindhyan range to the north. Near Jabalpur district, it carves a scenic gorge through marble rocks and creates the stunning Dhuandhar waterfall (not Malwa).
- Row 2 is correct: The Hundru Falls was created on the course of the Subarnarekha River. The falls is located on the Ranchi-Purulia Road on Chota Nagpur Plateau.
- Row 3 is incorrect: Jog Falls, also known as Gersoppa Falls, is located in the Shimoga district of Karnataka. It is created by Sharavathi river rising in the Western Ghats.

Source:

- <https://ncert.nic.in/ncerts/l/kegy103.pdf>
<https://ncert.nic.in/ncerts/l/fess206.pdf>
<https://www.india.com/travel/jog-falls/>
<https://ranchi.nic.in/tourist-place/hundru-waterfall/>
<https://karnatakaturism.org/tour-item/jog-falls/>

40. Consider the following information :

	Region	Name of the mountain range	Type of mountain
1.	Central Asia	Vosges	Fold mountain
2.	Europe	Alps	Block mountain
3.	North America	Andes	Fold mountain

In how many of the above rows is the given information correctly matched?

- (a) Only one (b) Only two
(c) Only three (d) All four

Ans: (b)

EXPLANATION :

- Row 1 is incorrect: Block Mountains are created when large areas are broken and displaced vertically. The uplifted blocks are termed as horsts and the lowered blocks are called graben. The Vosges Mountain in Europe (not in Central Asia) is an example of block mountain systems.
- Row 2 is incorrect: The Alps is one of the youngest fold mountains with rugged relief and high conical peaks located in Europe.
- Row 3 is correct: The Appalachians in North America is one of the very old fold mountains in the world.
- Row 4 is correct: Andes is one of the youngest fold mountains located in South America.

Source:

- <https://ncert.nic.in/ncerts/l/fess206.pdf>

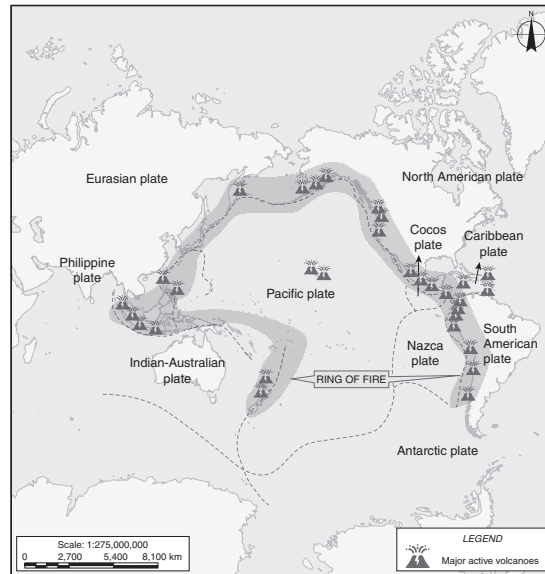


Figure 4.10 Rings of fire

Characteristics of Fold Mountains

- ◆ Fold Mountains are typically the highest mountain ranges on Earth.
- ◆ They are commonly concentrated along continental margins facing oceans.
- ◆ Recurrent seismic activity, such as earthquakes, is a common feature in these mountain belts.
- ◆ They have significant length but relatively small width.

Types of Fold Mountains Based on Nature of Folds

Simple Fold Mountains

- ◆ These mountains have open folds with well-developed systems of synclines (downward folds) and anticlines (upward folds) with wavy patterns.

- ◆ The United States, Indonesia, the Philippines, Turkey, New Zealand, Mexico, Italy and Iceland are among the top producers of geothermal energy.

GSI Discoveries

350 geothermal energy sites have been identified throughout India by the Geological Survey of India (GSI).

The Puga Valley in Ladakh is the most promising of these.

Potential in India

India's estimated potential for geothermal energy stands at about 10,000 MW.

Geothermal Provinces in India

There are seven geothermal provinces in India:

1. Himalayas
2. Sohana (Haryana)
3. Western Coast
4. Cambay
5. Son-Narmada-Tapi (SONATA)
6. Godavari
7. Mahanadi

Classification of Volcanoes

Based on Periodicity of Eruptions:

- Active Volcano:**
 - ◆ The last 10,000 years have seen the eruption of these volcanoes.
 - ◆ Mauna Loa in Hawaii, Mt. Kilauea, Etna in Sicily, Vesuvius in Italy, Stromboli in the Mediterranean Sea, Fujiyama in Japan, Krakatoa in Indonesia, Barren Island Volcano in the Andaman Islands, etc. are a few examples.
- Dormant Volcano:**
 - ◆ Dormant volcanoes have been inactive for a long time but may erupt in the future.
 - ◆ This dormancy occurs because tectonic plate movement can isolate the volcano from its magma source.
 - ◆ An example is Mauna Kea in Hawaii.

Based on Mode of Eruption

- Central Eruption Type or Explosive Type:**
 - ◆ This category includes various eruption types like Hawaiian, Strombolian, Volcanian, Pelean, Vesuvius and more.

b. Fissure Eruption or Quiet Eruption Type:

- ◆ Large volumes of lava silently pour out of fissures and cover the surrounding area in this type.
- ◆ Lava plateaus can form as a result of multiple successive lava flows.
- ◆ An example is the Deccan Plateau.

Distribution of Volcanoes

Volcanoes are distributed across the Earth as follows:

- ◆ About 15% of the world's active volcanoes are found along the 'constructive' or 'divergent' plate margins.
- ◆ Approximately 80% of volcanoes are associated with 'destructive convergent' plate boundaries.

Specific Volcanic Belts

Circum-Pacific Belt (Ring of Fire)

- ◆ Extends across the Kamchatka Peninsula, Kurile Islands, Japan, Philippines, New Guinea, New Zealand, Solomon Islands, Antarctica and the western coast of America.

Mid-Continent Belt

- ◆ Includes volcanoes along the Alpine mountain chain, the Mediterranean Sea and the fault zone in eastern Africa.
- ◆ Examples: Stromboli, Vesuvius, Etna, Kilimanjaro, etc.

Mid-Atlantic Belt

- ◆ Characterised by volcanoes of the fissure eruption type.
- ◆ Locations include Iceland, the Canary Islands, Cape Verde, the Azores, and more.

Types of Mountains: Fold Mountains

Formation of Fold Mountains

- ◆ When stress causes rocks in the Earth's crust to fold, fold mountains are formed; primarily due to compression forces, often associated with earthquakes.
- ◆ They form when sedimentary rock strata in geosynclines (large depressions in the Earth's crust with thick sediment deposits) experience compressive forces.

Rift Valleys and Block Mountains

- ◆ Block mountains can arise when the surrounding blocks are raised to form block mountains and the central block moves downward to form a rift valley.
- ◆ This phenomenon occurs between two parallel faults.

Examples of Block Mountains

- ◆ Block mountains can be found in various regions worldwide, including the following examples:
- ◆ India's Narmada, Tapi and Damodar valleys
- ◆ The French Vosges
- ◆ Germany's Black Forest, where the Rhine River flows
- ◆ Rift Valley of Great Africa
- ◆ North America's Sierra Nevada Mountains
- ◆ Germany's Harz Mountains

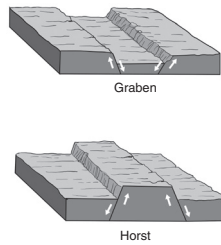


Figure 4.11 Types of block mountains

Volcanic Mountains

- ◆ Formed due to volcanic eruptions and the outflow of lava through a crater or opening.
- ◆ Also known as Mountains of Accumulation.
- ◆ Typically have a gentle slope.
- ◆ Examples include Cotopaxi in the Andes, Ojos del Salado in Argentina/Chile, Popocatepetl in Mexico, Vesuvius and Etna in Italy, Fujiyama in Japan, Mauna Loa and Kilauea in Hawaii (the most active volcano), Mount Rainier in Washington, Stromboli in the Mediterranean (known as the Lighthouse of the Mediterranean), Merapi and Krakatoa in Indonesia, Taal in the Philippines, and more.

Residual/Relict Mountains

- ◆ These mountains are the result of different erosion agents eroding high plains and plateaus.
- ◆ Residual mountains are what remains when the general land level has been lowered by erosion, and some resistant areas are left.
- ◆ They can also evolve from plateaus that have been dissected by rivers into hills and valleys.
- ◆ Examples of dissected plateaus include the Highlands of Scotland, Scandinavia and the Deccan Plateau.

<p>Himalayas</p> <ul style="list-style-type: none"> • Location: Asia (Nepal, India, Bhutan, China, Pakistan and more) • Highest Peak: Mount Everest (Sagarmatha/Chomolungma) at 8,848.86 m (29,031.7 ft) <p>Andes</p> <ul style="list-style-type: none"> • Location: South America (Argentina, Chile, Peru, Ecuador and more) • Highest Peak: Aconcagua at 6,959 m (22,831 ft) <p>Rocky Mountains</p> <ul style="list-style-type: none"> • Location: North America (USA and Canada) • Highest Peak: Mount Elbert at 4,401 m (14,440 ft) <p>Alps</p> <ul style="list-style-type: none"> • Location: Europe (Austria, France, Italy, Switzerland and more) • Highest Peak: Mont Blanc (Monte Bianco) at 4,809 m (15,777 ft) <p>Andean Plateau (Altiplano)</p> <ul style="list-style-type: none"> • Location: South America (Peru, Bolivia) • Highest Peak: Nevado Sajama at 6,542 m (21,463 ft) <p>Karakoram Range</p> <ul style="list-style-type: none"> • Location: Asia (Pakistan, China, India) • Highest Peak: K2 (Mount Godwin-Austen) at 8,611 m (28,251 ft) <p>Atlas Mountains</p> <ul style="list-style-type: none"> • Location: Africa (Morocco, Algeria, Tunisia) • Highest Peak: Toubkal at 4,167 m (13,671 ft) <p>Ural Mountains</p> <ul style="list-style-type: none"> • Location: Russia and Kazakhstan • Highest Peak: Mount Narodnaya at 1,894 m (6,214 ft) <p>Appalachian Mountains</p> <ul style="list-style-type: none"> • Location: North America (USA and Canada) • Highest Peak: Mount Mitchell at 2,037 m (6,684 ft)

Complex Fold Mountains

- ◆ The intense compression of rock strata results in a complex structure of folds in complex fold mountains.
- ◆ Some detached folds, known as 'nappe', can be found, which have moved away from their original locations due to tectonic forces. The Himalayas often exhibit this feature.

Classification of Fold Mountains Based on Age

Young/New Fold Mountains

- ◆ These mountains formed after the Continental Drift.
- ◆ The Alps, Andes, Rockies and Himalayas are a few examples. The Himalayas are thought to be the world's youngest mountains.

Old Mountains

- ◆ Ancient mountains have experienced denudation, or weathering and erosion, and date back to the pre-drift period, leading to the formation of many faults.
- ◆ They exist today as relict mountains and have worn down over time.
- ◆ Examples include the Pennines in the United Kingdom, the Ural Mountains in Russia, the Appalachians in the USA and the Aravallis in India.
- ◆ The oldest fold mountain system is the Aravalli Range in India, which has undergone substantial erosion over time. The Aravalli Delhi orogeny, a post-Precambrian event, is when it rose.

Anticlines and Synclines in Geology

Folds in Rock Formations: Folds in geological rock formations are formed when flat rocks become deformed due to stress and pressure.

These folds are classified into two main types: anticlines and synclines.

Anticlines (Upward Folds): Anticlines are upward folds in rock layers, resembling arches that arch away from the Earth's surface.

The highest point of the fold is known as the crest of the anticline.

In an anticline, the oldest rock layers are located at the core or centre of the fold.

Synclines (Downward Folds): Synclines are downward folds that resemble troughs, with the fold bending downward towards the Earth's surface.

In synclines, the newer rock layers are typically found at the centre of the fold, while older rock layers are on the outer edges.

Depressions formed by synclines are referred to as basins.

Cordillera in Geography

The term 'Cordillera' is used to describe several mountain groups and systems in geographic contexts.

A notable example is the Western Cordillera, which is located in the Western United States and British Columbia, Canada.

Block Mountains

Formation of Block Mountains

- ◆ Geological landforms known as block mountains are created when substantial portions of the Earth's crust are either lowered or raised (Horst, Graben).
- ◆ The uplift of structural mountains can sometimes be associated with the intrusion of magma into the Earth's crust.
- ◆ As the magma cools and hardens beneath the surface, it contracts, leading to the cracking and breaking of the overlying rock into large blocks, which can move either upward or downward.
- ◆ Strong rock folding frequently starts these processes, which are then followed by faulting brought on by horizontal tension forces.

Compression and Tension Forces

- ◆ The Earth's crust undergoes bending and folding due to compression forces, while it cracks and experiences faulting under tension forces.
- ◆ Faulted edges resulting from tension forces have steep inclinations, such as the Vosges and Black Forest in the Rhineland region.

41. The organisms "Cicada, Frog hopper and Pond skater" are :

- (a) Birds
- (b) Fish
- (c) Insects
- (d) Reptiles

Ans: (c)

EXPLANATION :

All of the Cicada, Frog hopper and Pond Skater belong to insects. The cicadas are a superfamily of insects in the order Hemiptera (true bugs). The frog hoppers, or the superfamily Cercopoidea, are a group of hemipteran insects in the suborder Auchenorrhyncha. Pond Skater are a family of insects in the order Hemiptera.

Source:

NCERT

42. Consider the following statements :

Statement-I: Many chewing gums found in the market are considered a source of environmental pollution.

Statement-II : Many chewing gums contain plastic as gum base.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (a)

EXPLANATION:

- Statement I is correct. Commercially, chewing gum is produced based on synthetic gum base, which is non-biodegradable. Accordingly, chewing gum residue can be considered as a dangerous environmental pollutant.
- Statement II is correct. Chewing gum does contain plastic. The ingredient known as “gum base” in the list of ingredients in chewing gum is largely made of polyvinyl acetate. This plastic is non-biodegradable and remains in the environment for a long time. Thus, chewing gum residue can be considered as a dangerous environmental pollutant.
- So, both Statement 1 and Statement 2 are correct, and Statement 2 explains Statement 1.

Source:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8231848/>

<https://www.thehindu.com/sci-tech/energy-and-environment/no-microplastics-new-rules-queue-the-pitch-for-biodegradable-plastics/article67977130.ece>

43. Consider the following pairs :

	Country	Animal found in its natural habitat
1.	Brazil	Indri
2.	Indonesia	Elk
3.	Madagascar	Bonobo

How many of the pairs given above are correctly matched?

- (a) Only one (b) Only two
(c) All three (d) None

Ans: (d)

EXPLANATION:

- Pair 1 is incorrectly matched. \ Indri is an endangered species found only in remote parts of northeastern Madagascar.
- Pair 2 is incorrectly matched. Elk is a subspecies of red deer (Cervus elaphus). It is found in North America and in high mountains of Central Asia.
- Pair 3 is incorrectly matched. Bonobos live in the rainforests of the Congo Basin in Africa.

Source:

https://wwf.panda.org/discover/knowledge_hub/endangered_species/great_apes/bonobo

<https://www.edgeofexistence.org/species/indri/#:-:text=Indri%20are%20endemic%20to%20Madagascar,but%20excluding%20the%20Masoala%20Peninsula>

<https://www.mendocinolandtrust.org/meet-the-elk/>

44. Consider the following statements regarding World Toilet Organization:

1. It is one of the agencies of the United Nations.
2. World Toilet Summit, World Toilet Day and World Toilet College are the initiatives of this organization, to inspire action to tackle the global sanitation crisis.
3. The main focus of its function is to grant funds to the least developed countries and developing countries to achieve the end of open defecation.

Which of the statements given above is/are correct?

- (a) 2 only (b) 3 only
(c) 1 and 2 (d) 2 and 3

Ans: (a)

EXPLANATION:

- Statement 1 is incorrect. World Toilet Organization was granted consultative status with the United Nations Economic and Social Council in 2013.
- Statement 2 is correct. WTO established World Toilet Day and the World Toilet Summit in 2001; this was followed by the World Toilet College in 2005.
- Statement 3 is incorrect. WTO empowers individuals through education, training and building local marketplace opportunities to promote clean and safe sanitation facilities in their communities. WTO continues to provide an international platform for toilet associations, governments, academic institutions, foundations, UN agencies and corporate stakeholders to exchange knowledge and leverage media and corporate support in an effort to promote clean sanitation and public health policies.

45. Consider the following statements:

1. Lions do not have a particular breeding season.
2. Unlike most other big cats, cheetahs do not roar.
3. Unlike male lions, male leopards do not proclaim their territory by scent marking.

Which of the statements given above are correct?

- | | |
|------------------|------------------|
| (a) 1 and 2 only | (b) 2 and 3 only |
| (c) 1 and 3 only | (d) 1, 2 and 3 |

Ans: (a)

EXPLANATION:

- Statement 1 is correct. Lions have no particular breeding season. Females cycle throughout the year every 16 days, remaining in estrous for four to eight days. Lions do not mate at a specific time of year and the females are polyestrous.
- Statement 2 is correct. Unlike other big cats, including lions, tigers, leopards, and jaguars, cheetahs don't roar. They growl when there is danger, and usually only chirp, purr and meow.
- Statement 3 is incorrect. Lions proclaim their territory by roaring and by scent marking. Leopards also proclaim their territory by roaring and by scent marking. Both sexes use urine to mark their territories, and often after urinating a male will then scrape the ground to transfer the scent of his urine onto his feet to be carried during territorial boundary patrols.

Source:

<https://www.deccanherald.com/india/did-you-know-fast-but-dismal-hunters-cheetahs-dont-roar-1145890.html> <https://www.nature.com/articles/329328a0.pdf>
<https://www.indianforester.co.in/index.php/indianforester/article/viewFile/27643/23955>

46. Which one of the following is the correct description of "100 Million Farmers"?

- (a) It is a platform for accelerating the transition towards food and water systems that are net-zero (carbon), nature-positive and that aims to increase farmer resilience.
- (b) It is an international alliance and a network of individuals and farming organisations interested in supporting and strengthening the development of the organic animal husbandry.
- (c) It is a digital platform fully integrated with service providers and built on blockchain that lets buyers, sellers and third parties trade fertilizers quickly and securely.
- (d) It is a platform with the mission of encouraging the farmers to form Farmer Product Organisations or Agribusiness Consortia, thus facilitating the access to global open markets to sell their products.

Ans: (a)

EXPLANATION:

100 Million Farmers is an initiative of World Economic Forum. The WEF's 100 Million Farmers Platform is developing regional coalitions of public and private sector organizations, NGOs, and academic institutions. It aims to accelerate the transition towards net-zero, nature-positive and farmer resilient food systems. It aims to position food and farmers as central pillars on the global climate and nature agenda and accelerate collective action to scale climate-and nature-friendly agricultural practices.

Source:

<https://initiatives.weforum.org/100-million-farmers/home>
<https://initiatives.weforum.org/100-million-farmers/about>

47. Consider the following :

1. Battery storage
2. Biomass generators
3. Fuel cells
4. Rooftop solar photovoltaic units

How many of the above are considered "Distributed Energy Resources"?

- | | |
|---------------|--------------|
| (a) Only one | (b) Only two |
| (c) All three | (d) All four |

Ans: (d)

EXPLANATION:

Distributed energy resources are small, modular, energy generation and storage technologies that provide electric capacity or energy where you need it. Typically producing less than 10 megawatts (MW) of power, DER systems can usually be sized to meet your particular needs and installed on site.

Examples of distributed energy resources that can be installed include:

- roof top solar photovoltaic units
- wind generating units
- battery storage
- batteries in electric vehicles used to export power back to the grid

- combined heat and power units, or tri-generation units that also utilise waste heat to provide cooling
- biomass generators, which are fuelled with waste gas or industrial and agricultural by-products
- open and closed cycle gas turbines
- reciprocating engines (diesel, oil)
- hydro and mini-hydro schemes
- fuel cells

Source:

<https://www.thehindubusinessline.com/economy/distributed-renewable-energy-a-promising-solution-to-address-rural-power-supply-challenges/article67119288.ece>
[https://www.aemc.gov.au/energy-system/electricity/electricity-system/distributed-energy-resources#:~:text=Distributed%20energy%20resources%20\(DER\)%20refers,battery%20storage](https://www.aemc.gov.au/energy-system/electricity/electricity-system/distributed-energy-resources#:~:text=Distributed%20energy%20resources%20(DER)%20refers,battery%20storage)

48. Which one of the following shows a unique relationship with an insect that has coevolved with it and that is the only insect that can pollinate this tree?
- | | |
|----------------|-----------------|
| (a) Fig | (b) Mahua |
| (c) Sandalwood | (d) Silk cotton |

Ans: (a)

EXPLANATION:

Mutualism is a type of interaction which confers benefits on both the interacting species. The most spectacular and evolutionarily fascinating examples of mutualism are found in plant-animal relationships. Plants need the help of animals to pollinate their flowers and disperse their seeds. Figs and wasps depend on each other to reproduce, and this is a fantastic example of co-evolution. In many species of fig trees, there is a tight one-to-one relationship with the pollinator species of wasp. It means that a given fig species can be pollinated only by its 'partner' wasp species and no other species. The female wasp uses the fruit not only as an oviposition (egg-laying) site but uses the developing seeds within the fruit for nourishing its larvae. The wasp pollinates the fig inflorescence while searching for suitable egg-laying sites. In return for the favour of pollination, the fig offers the wasp some of its developing seeds, as food for the developing wasp larvae.

Source:

NCERT Class 12th Biology Page 237

49. Consider the following :
- | | |
|----------------|---------|
| 1. Butterflies | 2. Fish |
| 3. Frogs | |

How many of the above have poisonous species among them?

- | | |
|---------------|--------------|
| (a) Only one | (b) Only two |
| (c) All three | (d) None |

Ans: (c)

EXPLANATION:

- Item 1 is correct. Monarch butterflies have poison in their vibrant wings.
- Item 2 is correct. There exist more than 1000 poisonous species of fish. For example, Reef Stonefish, which is the most venomous known fish.
- Item 3 is correct. Many species of frog are known to be poisonous. The Golden Poison Frog or *Phyllobates terribilis* is the most poisonous frog.

Source:

NCERT Class 11th Biology
<https://www.deccanherald.com/science/butterflies-are-pretty-and-poisonous-too-heres-why-1021085.html>
<https://fishesofaustralia.net.au/home/content/161> [https://www.nhm.ac.uk/discover/can-frogs-be-venomous.html#:~:text=But%20although%20incredibly%20rare%2C%20there,Greening's%20frog%20\(Corythomantis%20greeningi\)](https://www.nhm.ac.uk/discover/can-frogs-be-venomous.html#:~:text=But%20although%20incredibly%20rare%2C%20there,Greening's%20frog%20(Corythomantis%20greeningi))

50. Consider the following :
- | | |
|----------------|-----------|
| 1. Cashew | 2. Papaya |
| 3. Red sanders | |

How many of the above trees are actually native to India ?

- | | |
|---------------|--------------|
| (a) Only one | (b) Only two |
| (c) All three | (d) None |

Ans: (a)

EXPLANATION:

- Item 1 is incorrect. The Cashew is native to northeastern Brazil. Portuguese brought it to India during the late 16th century.
- Item 2 is incorrect. Papaya is native to Central America. It is grown in tropical and warmer subtropical areas worldwide. Papaya was introduced from Philippines through Malaysia to India in the later part of the 16th century.
- Item 3 is correct. Red Sanders is endemic to a distinct tract of forests in Andhra Pradesh. Red Sanders is reported to be one of India's most exploited tree species and is under severe pressure from illegal logging and harvesting. Following the amendment to the Wildlife (Protection) Act 1972 in December 2022, Red Sanders is now listed in Schedule IV.

Source:

<https://indianexpress.com/article/explained/goan-cashew-gets-gi-tag-how-this-can-help-the-industry-in-the-state-8978577/>

<https://www.thehindu.com/sci-tech/energy-and-environment/cites-records-28-incidents-of-red-sanders-confiscation-exported-from-india/article66463154.ece>

[https://www.nybg.org/blogs/plant-talk/2009/08/exhibit-news/the-cashew-tree-a-resource-of-nuts-%E2%80%9Capples%E2%80%9D-and-even-break-linings/#:~:text=The%20cashew%20tree%20\(Anacardium%20occidentale,and%20adjacent%20Bolivia%20and%20Paraguay](https://www.nybg.org/blogs/plant-talk/2009/08/exhibit-news/the-cashew-tree-a-resource-of-nuts-%E2%80%9Capples%E2%80%9D-and-even-break-linings/#:~:text=The%20cashew%20tree%20(Anacardium%20occidentale,and%20adjacent%20Bolivia%20and%20Paraguay)

<https://www.britannica.com/plant/papaya>

[https://forests.ap.gov.in/production-redsanders.php#:~:text=Red%20Sanders%20\(Pterocarpus%20santalinus\)%20is%20endemic,Hill%20ranges%20](https://forests.ap.gov.in/production-redsanders.php#:~:text=Red%20Sanders%20(Pterocarpus%20santalinus)%20is%20endemic,Hill%20ranges%20)

Reference in Lakshya -

A Compendium of General Studies:

6-96
Lakshya—A Compendium of General Studies

Modern India

Advent of the Europeans

Portuguese

- ◆ A new sea path to India through the **Cape of Good Hope** was discovered by **Vasco da Gama** in **1498**, thus marking the start of the European influence on Indian history.
- ◆ His first landing was at **Kapad** nearby Kozhikode in present day Kerala.
- ◆ **The ship he used, Saint Gabriel, brought Vasco da Gama to Kapad, the port of the Zamorin of Calicut.**
- ◆ Notable Portuguese figures in India included **Vasco da Gama, Francisco de Almeida, and Afonso de Albuquerque.**
- ◆ Vasco da Gama revisited India in 1502 and 1524, thus eventually passing away at Fort Cochin. The remains of Vasco were later taken to his home in Portugal.
- ◆ The first Portuguese governor in the East, Don Francisco de Almeida, implemented the '**Blue-water policy**' to establish a powerful navy.
- ◆ The Portuguese reached **Madras** in 1507. The city derived its title because of the name of Portuguese leader, Madra.
- ◆ Albuquerque, a significant Portuguese governor, played a crucial role in founding rule of Portuguese in India.
- ◆ **Albuquerque** attempted to abolish Sati.
- ◆ Albuquerque's mixed colony system encouraged Portuguese to marry Indians.
- ◆ The Portuguese aimed to **Latinise** Kerala as part of their religious policy.
- ◆ The disagreement regarding the formation of the Latin rite versus the Syrian rite culminated in the **Coonan Cross Oath** incident of 1653.
- ◆ The Portuguese brought to India new crops such as coconut, cashew, custard apple, and pineapple.
- ◆ The Portuguese brought tobacco to Akbar's court in the year 1604.
- ◆ The Portuguese control over Indian seas lasted until 1595.
- ◆ In 1556, India's **first printing press** was established by the Portuguese in Goa.
- ◆ The initial Portuguese fort was built in **Cochin**.
- ◆ In Bijapur, they seized Goa from the Dutch.
- ◆ The **United East India Company of the Netherlands** was established on March

- 20, 1602. It was also known as **Vereenigde Oostindische Compagnie (VOC).**
- ◆ In 1605, the Dutch established their initial trading post at Masulipatnam.
- ◆ Cochin was captured by the Dutch in 1663.
- ◆ In the Battle of Colachel, 1741, **Marthanda Varma**, the king of Travancore, emerged victorious against the Dutch.
- ◆ In the Battle of Bedara, 1759, the Dutch downfall in India was concluded as they lost to the English.

The English

- ◆ A consortium of merchants called '**The Merchant Adventurers**' established the English East India Company in 1599.
- ◆ Initially, the company was referred to as John Company.
- ◆ On December 31, 1600, the English East India Company gained official recognition when Queen Elizabeth of the Tudor dynasty issued a charter to the company.
- ◆ The English East India Company's inaugural ship, named Hector, arrived at Surat on August 24, 1606.
- ◆ By 1612, the East India Company transitioned into a joint-stock entity.
- ◆ In 1613, **Sir Thomas Roe**, the initial ambassador representing James I of England, arrived in Surat and had a meeting with Jahangir. This event signified the establishment of the initial English trading post or factory in Surat.
- ◆ Bombay was acquired on lease by East India Company from **Charles II**. He got it as a dowry from Portugal.
- ◆ In 1678, the English introduced the title of '**Chief Justice**' in India.
- ◆ In 1687, Madras gained the distinction of being the initial presidency to receive a municipal corporation charter, along with the establishment of a Mayor's court.
- ◆ Calcutta city was started by Job Charnock.

The French

- ◆ In 1664, Colbert, a minister under Louis XIV, established the 'Compagnie des Indes Orientales' (French East India Company).
- ◆ In 1668, **Francis Carton** founded the **initial French trading post or factory in Surat.**

51. Consider the following statements :

Statement-I : There is instability and worsening security situation in the Sahel region.

Statement-II: There have been military takeovers/coups d'etat in several countries of the Sahel region in the recent past.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect.
- (d) Statement-I is incorrect, but Statement-II is correct.

Ans: (a)

EXPLANATION:

The Sahel region countries have experienced coup in the last years. Since 2020, there have been nine coups in West Africa, Central Africa, and the Sahel region. Mali open the floodgates in May 2021, followed by Guinea in September 2021 and Sudan in October 2021. Earlier that year, Army had seized power in Chad, after the President was assassinated on the battlefield while visiting troops fighting rebels in the north. Burkina Faso joined this pattern and witnessed two military coups in 2022. In July 2023, the presidential guard overthrow the democratically elected government in uranium-rich Niger. The Gambia, Guinea-Bissau, and Sao Tome and Principe have all witnessed failed coup attempts last year.

52. Consider the following statements :

Statement-I: India does not import apples from the United States of America.

Statement-II: In India, the law prohibits the import of Genetically Modified food without the approval of the competent authority.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is in.correct, but Statement-II is correct

Ans: (d)

EXPLANATION:

- Statement I is incorrect. India does import apples from the United States of America. Recently, India decided to remove additional duties on import of eight US products, including apples. The import of apples from USA was to the value of US\$ 5.27 million (4,486 Ton) in FY 2022-23.
- Statement II is correct. In India, Genetically Modified Food can be imported only with the approval of the competent authority. Import of food products is regulated under the Food Safety and Standards Act (FSSAI), 2006. Indian Customs can clear food products including Genetically Modified (GM) food products only after necessary approval/No Objection Certificate (NOC) by FSSAI. The Food Safety and Standards Act of 2006 prohibits import, manufacture, use or sale of GM food without FSSAI's approval.

Source:

[https://pib.gov.in/PressReleasePage.aspx?PRID=1935460#:~:text=The%20import%20of%20apples%20from%20USA%20has%20decreased%20from%20US,\)%20in%20FY%202022%2D23.](https://pib.gov.in/PressReleasePage.aspx?PRID=1935460#:~:text=The%20import%20of%20apples%20from%20USA%20has%20decreased%20from%20US,)%20in%20FY%202022%2D23.)

<https://www.downtoearth.org.in/news/food/known-unknowns-india-s-apex-food-regulator-has-no-data-on-presence-of-gmos-in-fresh-produce-imported-over-past-5-years-92757>

Q. 53. With reference to the Speaker of the Lok Sabha, consider the following statements : While any resolution for the removal of the Speaker of the Lok Sabha is under consideration

1. He/She shall not preside.
2. He/She shall not have the right to speak.
3. He/She shall not be entitled to vote on the resolution in the first instance.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Ans: (a)

EXPLANATION:

- At any sitting of the Legislative Assembly, while any resolution for the removal of the Speaker from his office is under consideration, the Speaker, or while any resolution for the removal of the Deputy Speaker from his office is under consideration, the Deputy Speaker, shall not, though he is present, preside, and the provisions of clause (2) of article 180 shall apply in relation to every such sitting as they apply in relation to a sitting from which the Speaker or, as the case may be, the Deputy Speaker, is absent.
- Statement 1 is correct.
- Statement 2 is incorrect.
- Statement 3 is incorrect.

iii. By being removed from office by a resolution adopted by all of the house's members at the time (Article 94). It is forbidden to introduce such a resolution without giving at least 14 days' notice in advance, clearly stating that purpose.

Powers of the Speaker

- ◆ The speaker will serve as the Lok Sabha's chairperson and shall have a right of casting vote in the case of equality of votes (not in first instance), except when a resolution for his removal is under consideration, in which case he shall have the right to speak and right to vote but not the right of casting vote for resolving deadlocks (Article 96).
- ◆ He is ultimately in charge of enforcing the house's rules of procedure and keeping everything under control. It will be his responsibility to adjourn the house or to pause the meeting until a quorum is present if there is not one.
- ◆ No court has the authority to investigate or oversee the speaker's actions in keeping the house orderly or regulating procedure (Article 122).
- ◆ According to Article 118(4) of the Parliament, the speaker will preside over the joint session of the two houses. The Rajya Sabha Chairman does not possess such authority.
- ◆ It is the speaker who certifies that a financial bill transmitted from the lower house is a Money Bill and his decision regarding the same is final.

Deputy Speaker of the Lok Sabha

When the speaker is not present at a house session or when the speaker's office is vacant, the deputy speaker presides over the meetings of the Lok Sabha, unless a resolution for his own removal is being considered.

Chairman of the Rajya Sabha

Refer to the section on Vice-President.

Rajya Sabha vis-a-vis Lok Sabha

Limitations of the Rajya Sabha

- ◆ With the exception of making recommendations that the Lok Sabha may or may not approve, no authority to introduce or certify Money Bills.
- ◆ No power to vote on requests for grants or money for public spending.
- ◆ The Lok Sabha, not the Rajya Sabha, is the body to which the Council of Ministers is answerable.
- ◆ Has a numerical disadvantage in the event when the President calls a joint session.

Importance of the Rajya Sabha

- ◆ **Article 249:** The Parliament may pass interim legislation on an item on the state list only after the Council of States determines, by a vote supported by not less than two-thirds of its members present and voting, that it is necessary in the national interest to do so.
- ◆ **Article 312:** The Parliament may enact laws to establish one or more All-India Services that are shared by the Union and the States if the Council of States declare in a resolution backed by at least two-thirds of its members present and voting that doing so is required for the sake of the nation.
- ◆ **Article 368(2):** A Bill for Constitutional Amendment has to be passed in each House of the Parliament separately by a special majority with no resort to joint sitting.

Privileges and Immunities of the Parliament and its Members (Article 105)

Individual Privileges

- ◆ **Freedom from Arrest**—A Member of Parliament (MP) cannot be arrested while the house, any Committee, or both are continuing, nor during a combined sitting of the Chambers or Committees. Additionally, there is a 40-day window before and after the meeting or sitting. However, the immunity is limited to civil cases and does not apply to criminal cases or the Preventive Detention law.

54. With reference to the Indian Parliament, consider the following statements :

1. A bill pending in the Lok Sabha lapses on its dissolution.
2. A bill passed by the Lok Sabha and pending in the Rajya Sabha lapses on the dissolution of the Lok Sabha.
3. A bill in regard to which the President of India notified his/her intention to summon the Houses to a joint sitting lapses on the dissolution of the Lok Sabha.

Which of the statements given above is/are correct?

- | | |
|-------------|-------------|
| (a) 1 only | (b) 1 and 2 |
| (c) 2 and 3 | (d) 3 only |

Ans: (b)

EXPLANATION:

A Bill which originated in one House and was sent to the other and was pending before it, lapses on dissolution. This includes a Bill which originated in the Council and was sent to the House, as well as will originate in the House and was transmitted to and was pending before the Council. Only a Bill pending in the Rajya Sabha which has not yet been passed by the House shall not lapse on dissolution. A joint sitting of the two Houses summoned by the President and notified before the date of dissolution of Lok Sabha is not affected by subsequent dissolution [Art 108(5)].

Reference in Lakshya -

A Compendium of General Studies:

- ◆ During the Proclamation of Emergency, an Act approved by the Parliament may prolong the regular duration. The extension cannot be granted for longer than a year at a time and cannot be granted for more than 6 months following the Proclamation's expiration.

Sessions of the Parliament

The President has the power to *summon* or *prorogue* either house and to *dissolve* the House of People. The constitution states that the President must call a meeting of each house, so that there is no more than a 6-month gap between the last meeting of one session and the first meeting of the following one [Article 85(1)]. By amendments to Articles 85 and 87, the summoning of

Parliament twice a year and the requirement of special address at commencement of each session have been discontinued. The house is summoned now only once a year, and the President addresses both houses only at the commencement of first session of each year. The time between the initial convening of Parliament and its prorogation or dissolution is known as a session. There are several daily sittings during the session, broken up by adjournments. Recess is the time between where Parliament is located and when it reconvenes for a new session.

The sitting of a house may be terminated by:

- ◆ Dissolution
- ◆ Prorogation
- ◆ Adjournment.

Dissolution	<ul style="list-style-type: none"> ◆ It happens either on expiry of the term of 5 years, or the term as extended during a Proclamation of Emergency, or on exercise of the power by the President on advice of Council of Ministers [Article 85(2)]. ◆ Only the Lok Sabha is subject to dissolution. ◆ It brings an end to the House of People, so that fresh elections shall be held. ◆ A dissolution ends <i>all the matters pending</i> before the house, including notices, motions, and bills. ◆ A bill introduced in one house and was sent to the other and was pending before it, lapses on the dissolution of the house. Only bills that are still in the Council and have not yet been approved by the house will not expire upon dissolution⁴¹. ◆ A joint sitting of the two houses summoned by the President and notified before the date of dissolution of Lok Sabha is not affected by subsequent dissolution [Article 108(5)].
Prorogation	<ul style="list-style-type: none"> ◆ Prorogation terminates the session, but does not end the existence of Parliament. ◆ This power, too, is exercised by the President. ◆ Prorogation ends notices, motions, and resolutions, but bills remain unaffected⁴².
Adjournment	<ul style="list-style-type: none"> ◆ It delays business transactions for a predetermined period of time—hours, days, or weeks. ◆ It does not end the session of Parliament. ◆ It has no effect on pending business. ◆ This power is exercised by the speaker in the Lok Sabha and the chairman in the Rajya Sabha.

Speaker of the Lok Sabha

Position

The speaker will serve as the presiding officer of the Lok Sabha or the House of the People.

⁴¹ A bill which introduced in the council and was sent to the house, as well as will originate in the house and transmitted to the council.

⁴² Prorogation also removes any outstanding matters before the Parliament in England.

Appointment

The Lok Sabha will choose two of its members as speaker and deputy speaker, as soon as possible after the first sitting (Article 93). They typically serve in office for the duration of the house.

Termination

- By ceasing to be a member of the house.
- By submitting a written resignation to the deputy speaker and *vice versa*.

Q.55 With reference to the Parliament of India, consider the following statements :

- Prorogation of a House by President of India does not require the advice of the Council of Ministers.
- Prorogation of a House is generally done after the House adjourned sine die but there is no bar to the President of India Prorogation the House which is in session.
- Dissolution of the Lok Sabha is done by the President of India who, save in exceptional circumstances, does so on the advise of the Council of Ministers.

Which of the statements given above is/are correct?

- | | |
|-------------|-------------|
| a) 1 only | (b) 1 and 2 |
| (c) 2 and 3 | (d) 3 only |

Ans: (c)

EXPLANATION:

- Statement 1 is incorrect. The assent of the President for Prorogation is obtained after approval by the Cabinet Committee on Parliamentary Affairs / Prime Minister, as the case may be.
- Statement 2 is correct (Article 85).
- Statement 3 is correct. The exceptional circumstance could be the early dissolution of Lok Sabha where the Council of Ministers defeated in Lok Sabha asks the President to take an action.

- ◆ During the Proclamation of Emergency, an Act approved by the Parliament may prolong the regular duration. The extension cannot be granted for longer than a year at a time and cannot be granted for more than 6 months following the Proclamation's expiration.

Sessions of the Parliament

The President has the power to *summon* or *prorogue* either house and to *dissolve* the House of People. The constitution states that the President must call a meeting of each house, so that there is no more than a 6-month gap between the last meeting of one session and the first meeting of the following one [Article 85(1)]. By amendments to Articles 85 and 87, the summoning of

Parliament twice a year and the requirement of special address at commencement of each session have been discontinued. The house is summoned now only once a year, and the President addresses both houses only at the commencement of first session of each year. The time between the initial convening of Parliament and its prorogation or dissolution is known as a session. There are several daily sittings during the session, broken up by adjournments. Recess is the time between where Parliament is located and when it reconvenes for a new session.

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Prorogation	<ul style="list-style-type: none"> ◆ Prorogation terminates the session, but does not end the existence of Parliament. ◆ This power, too, is exercised by the President. ◆ Prorogation ends notices, motions, and resolutions, but bills remain unaffected⁴².
Adjournment	<ul style="list-style-type: none"> ◆ It delays business transactions for a predetermined period of time—hours, days, or weeks. ◆ It does not end the session of Parliament. ◆ It has no effect on pending business. ◆ This power is exercised by the speaker in the Lok Sabha and the chairman in the Rajya Sabha.

Speaker of the Lok Sabha

Position

The speaker will serve as the presiding officer of the Lok Sabha or the House of the People.

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⁴² Prorogation also removes any outstanding matters before the Parliament in England.

Appointment

The Lok Sabha will choose two of its members as speaker and deputy speaker, as soon as possible after the first sitting (Article 93). They typically serve in office for the duration of the house.

Termination

- By ceasing to be a member of the house.
- By submitting a written resignation to the deputy speaker and *vice versa*.

56. Consider the following statements :

Statement-I : The European Parliament approved The Net-Zero Industry Act recently.

Statement-II: The European Union intends to achieve carbon neutrality by 2040 and therefore aims to develop all of its own clean technology by that time.

Which one of the following is correct in respect of the above statements?

- Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- Statement-I is correct, but Statement-II is incorrect
- Statement-I is incorrect, but Statement-II is correct

Ans: (c)

EXPLANATION:

- Statement 1 is correct. On 6 February 2024, the European Parliament and the Council reached a political agreement on the Net-Zero Industry Act.
- Statement 2 is incorrect. The aim is to take EU's overall strategic net-zero technologies manufacturing capacity to at least 40% of annual deployment needs by 2030 that will accelerate the progress towards the EU's 2030 climate and energy targets and the transition to climate neutrality by 2050.

57. Consider the following statements :

Statement-I: Recently, Venezuela has achieved. a rapid recovery from its economic crisis and succeeded in preventing its people from fleeing/emigrating to other countries.

Statement-II : Venezuela has the world's largest oil reserves.

Which one of the following is correct in respect of the above statements ?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (d)

Explanation:

- Statement 1 is incorrect. The recovery has been extremely slow, and 75% population is in extreme poverty.
- Statement 2 is correct. Venezuela has the largest proven oil reserves in the world.

58. With reference to the Digital India Land Records Modernisation Programme, consider the following statements :

1. To implement the scheme, the Central Government provides 100% funding.
2. Under the Scheme, Cadastral Maps are digitised.
3. An initiative has been undertaken to transliterate the Records of Rights from local language to any of the languages recognized by the Constitution of India.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (d)

EXPLANATION:

All the Statements are correct. To implement the scheme, the Central Government provides 100% funding. Cadastral Maps are digitised. An initiative has been undertaken to transliterate the Records of Rights from local language to any of the languages recognized by the Constitution of India.

59. With reference to the 'Pradhan Mantri Surakshit Matritva Abhiyan', consider the following statements:

1. This scheme guarantees a minimum package of antenatal care service to women in their second and third trimesters of pregnancy and six months post-delivery health care service in any government health facility.
2. Under this scheme, private sector health care providers of certain specialities can volunteer to provide services at nearby government health facilities.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (b)

EXPLANATION:

- Statement 1 is incorrect. The facility can be availed only at designated government health institutions.
- Statement 2 is correct. The private sector practitioners are motivated to assist at government health facilities.

60. With reference to the Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM) Yojana, consider the following statements :

1. The entry age group for enrolment in the scheme is 21 to 40 years.
2. Age specific contribution shall be made by the beneficiary.
3. Each subscriber under the scheme shall receive a minimum pension of ₹ 3,000 per month after attaining the age of 60 years.
4. Family pension is applicable to the spouse and unmarried daughters.

Which of the statements given above is/are correct?

- (a) 1, 3 and 4
- (b) 2 and 3 only
- (c) 2 only
- (d) 1, 2 and 4

Ans: (b)

Constitutional Amendment Bill

Refer to the section on Amendments to the Constitution.

Procedure at Joint Sitting of the Parliament

- ◆ The joint sitting will be chaired by the speaker. In his absence, the person designated by the President's Rules of Procedure, which he made after consulting the speaker of the Lok Sabha and the chairman of the Rajya Sabha, will preside [Article 118(4)]. The order of precedence as provided by other rules so made is—Speaker, Deputy Speaker, Deputy Chairman of Council, and a person determined by the members at the joint sitting.
- ◆ If the bill has been *rejected* or *not returned* by the other house, after its passage in one house, only *such amendments may be proposed as are necessary by the delay* in the passage of the bill.
- ◆ If the impasse results from disagreements over amendments, other changes pertinent to the issues that the houses have disagreed on and amendments that are required because of the passage's delay may be submitted during the joint sitting.
- ◆ A bill is considered to have been enacted by both houses with any amendments agreed upon during the joint sitting if it is approved by the majority of the members of both houses who are present and voting.

Budget

Every fiscal year, the President is required to present a statement outlining the Government of India's anticipated receipts and outlays to both Houses of Parliament. This is referred to as the budget or the 'annual financial statement' [Article 112]. It contains:

- ◆ An examination of the closing year's actual revenues and expenses, together with the reasons for any surplus or shortfall.
- ◆ The government's spending plan and policies for the upcoming year, as well as the likelihood of revenue.

Expenditure Charged Upon the Consolidated Fund of India—Article 112(3)

- ◆ The President's emoluments and allowances, as well as the costs associated with his office.
- ◆ The pay and benefits of the speaker and deputy speaker of the Lok Sabha, as well as the chairman and deputy chairman of the Council of States.
- ◆ Debt obligation of the Indian government.
- ◆ The salaries, allowances, and pensions of or related to the Judges of the Supreme Court.
- ◆ The pensions of or related to Judges of any High Court.
- ◆ The salary, allowances, and pension to or in respect of the CAG.
- ◆ Any sum to be paid to comply with any judgement, decree, or award of any Court or arbitral tribunal.
- ◆ Any other expenditure declared by the Constitution or by the Parliament by law to be so charged.

- ◆ **Non-votable expenditure:** The expenditure charged upon the consolidated fund of India shall not be submitted to the vote of the Parliament, but each house can discuss any of these estimates.
- ◆ **Votable expenditure:** Other expenditures, including those proposed to be made from the Consolidated Fund of India, are submitted in the form of 'demands for grants' to the House of People.

Passage of The Budget

- ◆ **General Discussion:** After the budget is presented, there is a general discussion on the statement in either house. At this point, neither a motion nor a vote on the budget are made. Beyond the general debate, the Council of States has no more business on the budget.
- ◆ **Vote on 'Demands for Grants':**
 - ◆ After the general discussion, the estimates of expenditure, *other than those which are charged*, are submitted as demand for grants.

66. Who of the following is the author of the books "The India Way" and "Why Bharat Matters"?
- (a) Bhupender Yadav (b) Nalin Mehta
(c) Shashi Tharoor (d) Subrahmanyam Jaishankar

Ans: (d)

EXPLANATION:

The India way and Why Bharat Matters are authored by Subrahmanyam Jaishankar.

Source:

<https://timesofindia.indiatimes.com/life-style/books/reviews/review-the-india-way/articleshow/79604034.cms>
<https://www.newindianexpress.com/lifestyle/books/2024/Feb/17/why-bharat-matters-book-review-indias-worldview-reset>

67. Consider the following pairs :

	Country	Reason for being in the news
1.	Argentina	Worst economic crisis
2.	Sudan	War between the country's regular army and paramilitary forces
3.	Turkey	Rescinded its membership of NATO

How many of the pairs given above are correctly matched ?

- (a) Only one pair (b) Only two pairs
(c) All three pairs (d) None of the pairs

Ans: (b)

EXPLANATION:

- Statement 1 is correct. Argentina defaulted on the century bonds and other debts in 2020. With 140% inflation, the country is experiencing its worst economic crisis.
- Statement 2 is correct. The current conflict in Sudan is due to a struggle for power between the regular army and a paramilitary force called the Rapid Support Forces (RSF).
- Statement 3 is incorrect. Turkey is still a NATO member, but the stance of Mr. Erdogan has raised calls for reconsideration.

68. Consider the following statements :

Statement I: Sumed pipeline is a strategic route for Persian Gulf Oil and natural gas shipments to Europe.

Statement II: Sumed pipeline connects the Red Sea with the Mediterranean Sea.

Which one of the following is correct in respect of the above statement?

- (a) Both Statement-I and Statement-II are correct, and Statement-II explains Statement I
(b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
(c) Statement-I is correct, but Statement-II is incorrect
(d) Statement-I is incorrect, but Statement-II is correct

Ans: (a)

EXPLANATION:

- Statement 1 is correct. The Suez Canal, the SUMED pipeline, and the Bab el-Mandeb Strait are strategic routes for Persian Gulf oil and natural gas shipments to Europe and North America.
- Statement 2 is correct. It runs from the Ain Sokhna terminal in the Gulf of Suez, the northernmost terminus of the Red Sea, to Sidi Kerir port, Alexandria in the Mediterranean Sea.

69. Consider the following statements :

1. The Red Sea receives very little precipitation in any form.
2. No water enters the Red Sea from rivers.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (c)

EXPLANATION:

The Red Sea receives very little precipitation, and no water enters the Red Sea from the rivers.

Source:

Red Sea | Map, Middle East, Shipping, Marine Ecosystems, & Geology | Britannica

70. According to the Environmental Protection Agency (EPA), which one of the following is the largest source of sulphur dioxide emissions ?
- (a) Locomotives using fossil fuels
 - (b) Ships using fossil fuels
 - (c) Extraction of metals from ores
 - (d) Power plants using fossil fuels

Ans: (d)

EXPLANATION:

Environmental Protection Agency (EPA)'s national ambient air quality standards for SO₂ are designed to protect against exposure to the entire group of sulphur oxides (SO_x). The largest sources of SO₂ emissions are from fossil fuel combustion at power plants and other industrial facilities.

Source:

<https://indianexpress.com/article/upsc-current-affairs/upsc-essentials/upsc-essentials-weekly-news-express-rains-air-quality-subansiri-icelands-earthquakes-and-more-key-takeaways-and-points-to-ponder-9025983/>

<https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#:~:text=The%20largest%20source%20of%20SO,plants%20and%20other%20industrial%20facilities.>

<https://science.nasa.gov/earth/climate-change/greenhouse-gases/indias-growing-sulfur-dioxide-emissions/>

71. Who was the Provisional President of the Constituent Assembly before Dr. Rajendra Prasad took over?
- (a) C. Rajagopalachari
 - (b) Dr. B.R. Ambedkar
 - (c) T.T. Krishnamachari
 - (d) Dr. Sachchidananda Sinha

Ans: (d)

EXPLANATION:

Dr. Rajendra Prasad was later elected as the Chairman.

72. With reference to the Government of India Act, 1935, consider the following statements:
1. It provided for the establishment of an All India Federation based on the union of the British Indian Provinces and Princely States.
 2. Defence and Foreign Affairs were kept under the control of the federal legislature.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Ans: (c)

EXPLANATION:

Both statements are correct. The Government of India Act, 1935 provided for the establishment of an All India Federation based on the union of the British Indian Provinces and Princely States. Defence and Foreign Affairs were kept under the control of the federal legislature.

included 36 items such as criminal law and procedure, civil procedure, marriage and divorce, and arbitration.

- It provided for the establishment of a federal court (Set up in 1937).
- It also provided for establishment of federal service commission, provincial service, women and workers.
- In case of emergency proclaimed by the Viceroy or arising out of the desire of two or more legislature in their common interest, the central legislature could enact laws on the items given in the provincial list.
- In case of dissatisfaction on a matter in the concurrent list, a federal law prevailed. However, a provincial law took precedence if it had been reserved for the Viceroy's consideration and approved by him.
- The residual power of legislation laid with the Viceroy.
- ♦ The Act provided for separate electorates for Muslims, Sikhs, the Europeans, Indian Christians, and Anglo-Indians.
- ♦ The 'Dominion Status' promised in 1929 was not conferred.

Shortcomings

- ♦ In some matters, the Governor had to make decisions 'in his discretion' or under the Viceroy's supervision, without consulting the ministers.
- ♦ The 1935 Act had to replace the executive council provided by the 1919 Act with the counsellors or council of ministers. However, the latter never materialised, and, thus, the former council continued to advise the Viceroy until the Indian Independence Act, 1947.
- ♦ Any passed bill could be vetoed by the Viceroy and the Crown.
- ♦ The Viceroy could also suspend the proceedings related to a particular bill in the legislature on being certain that it would affect his ability to carry out his 'special responsibilities'.
- ♦ The Viceroy had parallel legislating powers—that is, to make temporary ordinances during recess and permanent acts when the legislature was in session.
- ♦ In some situations, such as when a bill or amendment sought to repeal, amend, or be incompatible with a British Parliament law that applied to India or a Viceroy's or Governor's Act or when it attempted to influence matters in which the Viceroy was to act at his discretion, it could not be introduced in

the legislature without the Viceroy's prior approval.

- ♦ When proposed to a Governor for approval, bills that reduced the authority of the High Court or had an impact on the Permanent Settlement were to be kept for the Viceroy's or the Crown's consideration, respectively.

Government of India Act, 1947

- ♦ The British Crown's suzerainty over Indian States and the treaty of relations with Tribal Areas ended on the date that India ceased to be a dependent nation.
- ♦ There was no longer a Secretary of State for India.
- ♦ It sought to divide India into two sovereign nations—India and Pakistan. The Governors-General of the two Dominions assumed the role of their respective constitutional heads. The executive council established by the 1919 Act, the provision of counsellors by the 1935 Act, and the powers of the Viceroy to make governors act as his agents ceased to exist. The constitutional heads could not act without or against the wishes of the ministers.
- ♦ Neither India nor Pakistan derived its authority from Britain.
- ♦ The Viceroy and the Governors lost all their extraordinary powers of legislation by proclamations, ordinances, or certification.
- ♦ The provincial constitution could no longer be suspended by the provincial constitution.
- ♦ The Crown was no longer be able to use its veto power or reserve a bill for its consideration.
- ♦ On 14 August, 1947, the legislative assembly and the council of states that made up the Central Legislature of India were abolished. The constituent assembly of the two dominions (until they themselves desired otherwise) became the constituent as well as legislative body.
- ♦ The Indian territory excluded the provinces of Sind, Baluchistan, West Punjab, East Bengal, the North-Western Frontier Province, and the Sylhet district of Assam.

Making of the Constitution

Cripps Mission, 1942

In the aftermath of World War II and the internal disturbances in British India, Sir Stafford Cripps was sent to resolve the Indian constitutional problem.

73. Which one of the following is a work attributed to playwright Bhasa?

- | | |
|----------------------|------------------|
| (a) Kavyalankara | (b) Natyashastra |
| (c) Madhyama-vyayoga | (d) Mahabhashya |

Ans: (c)

EXPLANATION:

- The correct answer is Madhyama-vyayoga.
- Natyashastra reminds us of Bharat Muni's Natyashastra, Dance, Drama and Music.
- Mahabhashya was written by Patanjali, and it was a commentary on Pārini's Ashtadhyayi.

- ◆ They rejected the divine authority of God, rebirth, and, hence, salvation.
- ◆ They emphasised the maximisation of physical pleasure, which is reflected in one of the popular phrases:
 - यवत् जीवेत् सुखम् जीवेत् ।
ऋणं कृत्वा घृतं पबेत् ।
 - Yavat Jivite Sukham Jivite
Rinam Kritva ghartam pibet

Ajivika

- ◆ Founder: Makhali putra Gosala.
- ◆ He was a contemporary of Mahavir.
- ◆ The philosophy of Ajivika is known as Niyat-ivad: Theory of Destiny.
- ◆ According to this philosophy, there is no free will, as such one cannot change what is destined.
- ◆ Whatever has happened, is happening and will happen, one cannot change it.
- ◆ They rejected the theory of God, salvation, and Veda.

Other Religion: Zoroastrianism (Parsi)

- ◆ They believed that there are two types of spirits that operate in the universe which is:
 - Spenta Mainyu (spirit of good)
 - Angra Mainyu (spirit of evil)
- ◆ When they are in balance, there is a natural cycle of creation, birth, and death.
- ◆ But the natural tendency of Angra Mainyu is to dominate.
- ◆ In this situation, Zoroaster God Ahur Mazda represented through fire established the equilibrium.
- ◆ Ahur Mazda is considered a fire god and is worshipped inside Atash Behram, a fire temple.
- ◆ Zend-Avesta is considered the holy text of zoroastrianism.
- ◆ Parsis were also known for their unique last-rite practices whereby they did not cremate their dead or bury them; instead, dead bodies were left fallow in open spaces to be fed by scavengers.

Classical Dances of India

Evolution of Dance

- ◆ Bharat Muni's Natyashastra is considered the first treatise on dance, drama, and music.

- ◆ Lord Brahma requested Bharat Muni to create a pastime with philosophies by taking the elements from existing Vedas and to introduce Kaushiki Vriti (expressions, vocal, emotions, delicacy into it). Then, Bharat Muni taught this to Apsaras (female character). The Natyashastra explains all the concepts of theatre and dance that include expression, movements, music, theatre, construction, costumes, etc.
- ◆ As such, Bharat Muni took the following elements: Pathya (words) taken from Rig Veda, Abhinaya (expression)—Yajur Veda, Geet (music)—Sama Veda, and Rasa (emotions)—Atharva Veda.
- ◆ Natyashastra further mentions the two aspects of dance and three elements of the dance.

Aspects—Lasya and Tandava

- ◆ Lasya is a feminine aspect of dance. It is characterised by soft and beautiful movements, strong expression, and grace.
- ◆ The first mythological example of Lasya is Goddess Parvati's dance on the occasion of her marriage with Lord Shiva.
- ◆ Tandava—it is the masculine aspect of the dance, characterised by fast movement, aggression, strength, and determination.
- ◆ The first mythological example is Lord Shiva's Tandava—Bhairava Tandava associated with the destruction of the universe and Ananda Tandava associated with the reconstruction of the universe.
- ◆ Another mythological example is Lord Krishna's Tandava on the head of Kaliya Naag.

Three Elements of Dance

- ◆ **Nritta**—pure dance movement without any expression.
- ◆ **Natya**—dramatic expression.
- ◆ **Nritya**—abhinaya with dance movement.

Later, **Nandikeshvara** wrote **Abhinaya Darpan**, which elaborated on the use of **Rasa or emotions** in the dance, which are as follows: **Nav Rasas**

- ◆ **Shringar**—love
- ◆ **Vir**—courage
- ◆ **Hasya**—laughter
- ◆ **Karunya**—tragedy
- ◆ **Adbhut**—amazement

Vedic Literature

Rig Veda

- ◆ It was the first Veda to be composed.
- ◆ Rig Veda is the earliest collection of 1,028 hymns.
- ◆ Rig Veda is divided into Ten(X) Mandalas (chapters), out of which Mandala II-VII is the oldest, composed during the early Vedic period.
- ◆ Mandala numbers I, VIII, IX, and X were later additions composed during the Later Vedic period.
- ◆ The expert priest of Rig Veda was known as Hotra.

Yajur Veda

- ◆ Yajur Veda is considered the Veda of performance of sacrificial rituals.
- ◆ It provides guidelines for the performance of Yajna and the important Vedic rituals.
- ◆ It is the most popular among all the Vedas.
- ◆ It is split into two sections, namely, Shukla Yajur Veda and Krishna Yajur Veda.
- ◆ The expert priest of Yajur Veda was Adhvaryu.

Sama Veda

- ◆ It is considered the Veda of music.
- ◆ All those hymns of Rig Veda, which were sung, constitute Sama Veda.
- ◆ The later part of Sama Veda is known as Gandharva Veda—it is considered the rule book of music.
- ◆ It mentions about 16,000 Ragas and Raginis.
- ◆ The expert priest of Sama Veda was Udgatar.

Atharva Veda

- ◆ The origin of this Veda can be attributed to Atharva Rishi and Angira Rishi.
- ◆ It is the most elaborate of all the Vedas.
- ◆ It mentions the cure of 99 diseases.
- ◆ It also includes the topics related to astrology, astronomy, mathematics, metallurgy, botanical, and geological knowledge of India.

Classical Sanskrit Literature

Classical Sanskrit literature refers to the literary works composed in Sanskrit, the ancient and classical language of India.

i. Upanishads

- The Upanishads are philosophical texts that explore the nature of reality, the self (atman), and the ultimate truth (Brahman). Examples include the Chandogya Upanishad, Brihadaranyaka Upanishad, and Mandukya Upanishad.

ii. Epics

- **Mahabharata:** Composed by Sage Vyasa, the Mahabharata is an epic narrative that includes the Bhagavad Gita, a sacred dialogue between Lord Krishna and the warrior Arjuna.
- **Ramayana:** Attributed to the sage Valmiki, the Ramayana narrates the story of Lord Rama, his wife Sita, and his loyal companion Hanuman.

iii. Puranas

- The Puranas are a genre of ancient Indian literature that contains mythological stories, legends, and genealogies. Examples include the Vishnu Purana, Shiva Purana, and Bhagavata Purana.

iv. Kavya (Poetry)

- **Kalidasa:** Often considered the greatest poet in classical Sanskrit literature, Kalidasa's works include 'Shakuntala', 'Meghaduta', and 'Raghuvamsha'.
- **Bharavi:** Wrote 'Kiratarjuniya', an epic poem depicting the battle between Lord Shiva and Arjuna.

v. Drama (Nataka)

- **Bhasa:** Though many of Bhasa's works are lost, a few plays such as 'Swapnavasavadatta' have survived. He is considered a pioneer in Sanskrit drama.
- **Kalidasa:** His play 'Shakuntala' is a classic in Sanskrit drama.

vi. Shastra Literature

- **Arthashastra:** Attributed to Chanakya (Kautilya), this ancient treatise covers political science, economics, and military strategy.
- **Kama Sutra:** Attributed to Vatsyayana, it is a comprehensive guide on human sexuality and relationships.

vii. Grammar and Linguistics

- **Panini:** His work 'Ashtadhyayi' is a foundational text in Sanskrit grammar.
- **Patanjali:** Known for his 'Mahabhashya', a commentary on Panini's grammar.

74. Sanghabhuti, an Indian Buddhist monk, who travelled to China at the end of the fourth century AD, was the author of a commentary on :
- | | |
|--------------------------|-------------------|
| (a) Prajnaparamita Sutra | (b) Visuddhimagga |
| (c) Sarvastivada Vinaya | (d) Lalitavistara |

Ans: (c)

EXPLANATION:

- Sanghabhuti was a Buddhist monk who visited China between 380 to 384 AD, and he wrote commentaries on Sarvastivada Vinaya.
- On the other hand, Prajnaparamita Sutra was written by Kumar Jeev.
- Buddhaghosa was the writer of Visuddhimagga and Lalit Vistar is the holy textbook of Mahayana Buddhism.

75. Consider the following properties included in the World Heritage List released by UNESCO:
- | | |
|-------------------------------------|---|
| 1. Shantiniketan | 2. Rani-ki-Vav |
| 3. Sacred Ensembles of the Hoysalas | 4. Mahabodhi Temple Complex at Bodhgaya |

How many of the above properties were included in 2023 ?

- | | |
|----------------|--------------|
| (a) Only one | (b) Only two |
| (c) Only three | (d) All four |

Ans: (b)

EXPLANATION:

- One is Shantiniketan and another is the Hoysala temple that were included in UNESCO's World Heritage List, recently from India.
- Three Hoysala Sacred Ensembles were included in this list: Hoysaleswara temple, Chennakeshava temple of Belur and Channakeshava temple of Somnathpura.

Reference in Lakshya -

A Compendium of General Studies:

Cholas

Thanjavur Temple Style

♦ Rajarajeswara (Brihadeshwara) Temple

- Finished around 1009 under the patronage of Rajaraja Chola.
- Largest and tallest Indian temple, thus showcasing fully realised Tamil architecture.
- Pyramidal multi-storeyed vimana rises 70 m, topped by an octagonal dome-shaped stupika.

Architectural Scale

- Chola temples surpass predecessors in scale, including **Pallavas**, **Chalukyas**, and **Pandyas**.
- **Main deity is Shiva**, represented by a **large lingam** in a two-storied sanctum.
- Commissioned the iconic brass Nataraja (Shiva as Lord of Dance) in the 11th century.

Great Living Chola Temples

- **BAG Complex: Brihadeshwara, Airavateswara, and Gangaikonda Cholapuram.**

Deccan Architecture—Vesara Style

♦ Transition of Power

- Mid-7th century onward, Deccan architecture witnessed the emergence of the Vesara style, blending Nagara and Dravida influences.
- Rashtrakutas replaced the early Western Chalukya control by around 750 CE.

♦ Kailasa or Kailashnath Temple at Ellora

- Under Krishna I's rule, the **Kailashnath shrine at Ellora** stands tall as a remarkable architectural achievement.
- Represents the apex of a 1,000-year-old tradition in rock-cut architecture.
- Complete Dravida style, featuring a Nandi shrine, gateway resembling a gopuram, along with cloisters, subsidiary shrines, staircases, and a towering vimana reaching 30 m.
- Entire structure carved meticulously out of living rock.

♦ Monolithic Wonder

- Notably, the entire **Kailashnath temple is hewn from a monolithic hill.**

- The monolithic rock was sculpted with precision to construct this awe-inspiring temple.

♦ Dynamic Sculptures

- **Rashtrakuta** sculpture at Ellora is characterised by dynamism.
- The figures, frequently surpassing life-size proportions, showcase unparalleled grandeur and emanate a compelling energy.

Evolution of Vesara Architecture in Karnataka

♦ Early Chalukyan Rock-Cut Caves

- Karnataka showcases diverse experimental hybrid styles of Vesara architecture.
- Early Chalukyan activity involves rock-cut caves, with the Ravana Phadi rock cave at Aihole (dedicated to Shiva) being one of the earliest examples.
- Ravana Phadi is renowned for its distinctive sculptural style.

♦ Aihole Sculptures

- Notable sculptures at Aihole include an important depiction of Nataraja, surrounded by larger-than-life saptamatrikas (seven divine mothers).

♦ Pattadakal—Synthesis of Styles

- Chalukyan buildings, like the elaborate ones at Pattadakal (UNESCO World Heritage Site), showcase hybridisation and incorporate various styles.
- The Loka Mahadevi temple in Pattadakal, constructed during the rule of Vikramaditya II, understanding of Pallava architecture seen at Kanchipuram and Mahabalipuram.

♦ Durga Temple at Aihole

- The Durga temple at Aihole stands out with an early apsidal shrine style, reminiscent of Buddhist chaitya halls.

♦ Lad Khan Temple

- The Lad Khan temple at Aihole draws inspiration from wooden-roofed hill temples, yet it is crafted entirely from stone.

♦ Hoysala Dynasty

- As Chola and Pandya influence waned, the Karnataka's Hoysalas, centred at Mysore, became prominent.

Amendments to the Constitution

Procedure for Amending the Constitution

- ◆ **Initiation**—A Bill for Amendment of the Constitution can be initiated in either House of Parliament. The President's prior approval is not necessary in order to introduce any such bill.
- ◆ **Passing of the Bill**
 - After passing with a special majority of the Union Parliament, which consists of more than 50% of the Houses' members and a majority of at least two-thirds of those in attendance and voting, the bill will be sent to the President for his approval, and if he grants it, the Constitution will be amended to reflect the changes made to it.
 - The Bill must be passed in each House separately before presented to the President for his assent.
 - Article 108 does not provide for the joint session of the two Houses to resolve a deadlock in a bill amending the constitution.
- ◆ **Ratification by the States**—The amendment shall be ratified by the legislatures of not less than one-half of the states before being presented to the President for his assent if the Bill seeks to amend any of the following provisions:
 - Manner of election of the President (Articles 54 and 55).
 - Extent of the executive power of the Union and the states (Articles 73 and 162).
 - The Supreme Court and the High Courts (Article 241, Chapter IV of Part V, Chapter V of Part VI).
 - Distribution of legislative powers between the Union and the states (Chapter I of Part XI).
 - Any list in the 7th Schedule.
 - Representation of the states in Parliament (Articles 80-81, 4th Schedule).
 - Art 368 itself.
- ◆ A few provisions can be amended by simple majority required for general legislation, which shall not be deemed to be amendments to the Constitution.
- ◆ After the 24th Amendment Act, 1971, the President is bound to give his assent to a Constitutional Amendment Bill, unlike Ordinary Bills where he can withhold his assent. The formality is only to signify the date when the act becomes operational.

- ◆ Subject to the provisions of Article 368, Constitution amendment Bills are to be passed like Ordinary Bills.
- ◆ The Parliament is the only entity having the authority to modify the Constitution.

Flexible Nature of the Constitution

- ◆ No portion of our Constitution was unamendable up to 1967, according to the Supreme Court. The Parliament could alter any provision, including the fundamental rights and Article 368 itself, by passing the Constitution Amendment Act (Article 368). Hence, the Parliament could override court decisions because 'law' in Article 13(2) only refers to customary legislation, not to a Constitutional change that the Parliament and its constituent bodies have passed.
- ◆ In *Golak Nath versus State of Punjab*, 1967, the Supreme Court over-ruling its earlier decisions held that the fundamental rights have a 'transcendental position' and cannot be amended by any authority functioning under the Constitution, including the Parliament itself. It held that if any of such rights are to be amended, a new Constituent Assembly must be convened.
- ◆ The 1967 ruling was superseded by the 24th Amendment Act of 1971, which revised Articles 13 and 368 to make it clear that fundamental rights may be modified through the process outlined in Article 368. It specifically stated that a Constitutional Amendment under Article 368 will not be a law under the purview of Article 13 and its validity shall not be open to question on the ground that it takes away or affects a fundamental right.
- ◆ In 13 judge-bench *Kesavananda Bharati's* case, 1973, it was upheld that Article 13 does not comprehend Constitutional Amendment Acts and Article 368 does not make any exception to fundamental rights. Consequently, an act may change fundamental rights in accordance with Article 368, and the act's legitimacy cannot be contested on the grounds that it infringes upon fundamental rights.
- ◆ A newly developed court doctrine known as 'basic features' was implemented, thus holding that a constitutional amendment could only change clauses other than the fundamental elements of the document because doing so would equate to creating a

77. Consider the following countries:

- | | |
|-----------------|----------------|
| 1. Italy | 2. Japan |
| 3. Nigeria | 4. South Korea |
| 5. South Africa | |

Which of the above countries are frequently mentioned in the media for their low birth rates, or ageing population or declining population?

- | | |
|------------------|------------------|
| (a) 1, 2 and 4 | (b) 1, 3 and 5 |
| (c) 2 and 4 only | (d) 3 and 5 only |

Ans: (a)

EXPLANATION:

This is a factual question, and references to Italy, Japan, and South Korea are made frequently.

79. Which of the following is/are correctly matched in terms of equivalent rank in the three services of Indian Defence forces?

	Army	Airforce	Navy
1.	Brigadier	Air Commodore	Commander
2.	Major General	Air Vice Marshal	Vice Admiral
3.	Major	Squadron Leader	Lieutenant Commander
4.	Lieutenant Colonel	Group Captain	Captain

Select the correct answer using the code given below:

- (a) 1 and 4
(b) 1 and 3
(c) 2, 3 and 4
(d) 3 only

Ans: (d)

EXPLANATION:

The correct sequence is:

Indian Army	Indian Navy	Air Force
Brigadier	Commodore	Air Commodore
Major General	Rear Admiral	Air Vice Marshal
Major	Lieutenant Commander	Squadron Leader
Lieutenant Colonel	Commander	Wing Commander

Complete List of Ranks

Indian Army	Indian Navy	Air Force
*Field Marshal	*Admiral of the Fleet	*Marshal of the Air Force
General	Admiral	Air Chief Marshal
Lieutenant General	Vice Admiral	Air Marshal
Major General	Rear Admiral	Air Vice Marshal
Brigadier	Commodore	Air Commodore
Colonel	Captain	Group Captain
Lieutenant Colonel	Commander	Wing Commander
Major	Lieutenant Commander	Squadron Leader
Captain	Lieutenant	Flight Lieutenant
Lieutenant	Sub-Lieutenant	Flying Officer

Source –

<https://www.indiatoday.in/education-today/gk-current-affairs/story/officer-ranks-in-indian-army-air-force-and-navy-1464351-2019-02-25>

(Continued)

Personality	Great Work(s)
Anne Frank	Diary: 'The Diary of a Young Girl'
Wole Soyinka	Play: 'Death and the King's Horseman'
Harper Lee	Novel: 'To Kill a Mockingbird'
Aristotle	Works on philosophy: 'Nicomachean Ethics,' 'Politics'
Antoine de Saint-Exupéry	Novel: 'The Little Prince'
Jawaharlal Nehru	Autobiography: 'The Discovery of India'
Leo Messi	Achievements in football, including numerous records and awards
Stephen Hawking	Book: 'A Brief History of Time'
Akira Kurosawa	Film: 'Seven Samurai'
Alfred Hitchcock	Films: 'Psycho,' 'Vertigo,' 'The Birds'
Michael Jackson	Album: 'Thriller'
Aung San Suu Kyi	Autobiography: 'Freedom from Fear'
Benjamin Franklin	Autobiography: 'The Autobiography of Benjamin Franklin'
Emily Dickinson	Various influential poems
Rosa Parks	Role in the Civil Rights Movement
Mao Zedong	'Little Red Book' (Quotations from Chairman Mao)

Personality	Great Work(s)
Pandit Ravi Shankar	Contributions to Indian classical music
Marlon Brando	Acting in films: 'The Godfather,' 'A Streetcar Named Desire'
Oscar Wilde	Play: 'The Importance of Being Earnest'

Institution/Eminent Works and Founder

Works	Founder
Red Guards	Garibaldi
Red Cross	Henry Dunant
Khalsa Panth	Guru Gobind Singh
Vishwabharati	Rabindra Nath Tagore
League of Nations	Woodrow Wilson
Anand Van	Baba Amte
Scouts	Baden Powell
Socialism	Acharya Narendra Dev
Auroville Ashram (Puducherry)	Aurobindo Ghosh
Pawnar Ashram	Vinoba Bhave
Shantiniketan	Rabindra Nath Tagore
Golden Temple	Guru Arjun Dev

Indian Defence Services

Indian Defence Services

- ◆ The Indian Defence Services stand out globally, excelling in managing both natural and man-made disasters.
- ◆ India holds an impressive 4th rank out of 145 countries in terms of military strength, following the United States, Russia, and China, according to the 2023 annual review by the Global Firepower Index.
- ◆ The PowerIndex (PwrIndex) Score of 0.1025 signifies India's robust military capability.
- ◆ The Indian Armed Forces, comprising the Army, Air Force, and Navy, play a pivotal role in ensuring national security.

Indian Army

Indian Air Force

Indian Navy

Indian Army

- ◆ The Indian Army, the largest land-based branch of the Armed Forces, operates under the Supreme Commander, the President of India, with the Chief of Army Staff (COAS) as its professional head.
- ◆ Evolving from the East India Company's presidency armies, the Indian Army was established on 1 April 1895 and absorbed princely state armies' post-independence.

- ◆ **Army Day**, celebrated on 15 January, commemorates Lieutenant General K. M. Cariappa's historic appointment as the first 'Indian' Chief of the Army Staff in 1949.
- ◆ Following India's republic status on 26 January 1950, all active-duty Indian Army officers holding the King's Commission were recommissioned.
- ◆ The army operates six operational commands, each headed by a Lieutenant General reporting to Army HQ in New Delhi. The Army Training Command (ARTRAC) and tri-service commands, like the Strategic Forces Command and Andaman and Nicobar Command, are integral components.

Army Command and Its Headquarters

Army Command	Headquarter
Central Command	Lucknow
Eastern Command	Kolkata
Northern Command	Udhampur
Southern Command	Pune
Southwestern Command	Jaipur
Western Command	Chandimandir
Army Training Command	Shimla

Indian Air Force

- ◆ **Motto Inspiration:** The inspiring motto of the Indian Air Force, 'Touch the sky with Glory', finds its roots in the eleventh chapter of the Gita, where Lord Krishna imparts wisdom to Arjuna on the battlefield of Kurukshetra during the Mahabharata.
- ◆ **IAF Overview:** Serving as the aerial defence force of the Indian Armed Forces, the Indian Air Force (IAF) stands dedicated to safeguarding Indian airspace and executing aerial operations during armed conflicts.
- ◆ **Historical Journey:** Established on October 8, 1932, as a crucial auxiliary air force under the British Empire, the IAF earned the Royal prefix in acknowledgement of its service during World War II. Post-independence in 1947, it retained the name Royal Indian Air Force, shedding the Royal prefix in 1950 with the transition to a republic.

- ◆ **Command Hierarchy:** The President of India holds the esteemed position of the Supreme Commander of the IAF. The Chief of the Air Staff, an air chief marshal, oversees the majority of operational command, with the rare honour of a five-star rank bestowed upon Arjan Singh in 2002.
- ◆ **Organisational Structure:** Structurally, the IAF is organised into five operational commands and two functional commands. Operational commands focus on executing military operations within their designated areas, while functional commands ensure combat readiness.
- ◆ **Training Excellence:** The Air Force Academy in Hyderabad is the cornerstone for primary flight training, complemented by advanced officer training at the Defence Services Staff College. Specialised flight training schools, located at Bidar, Karnataka, and Hakimpet, Telangana, contribute to honing the skills of future IAF aviators.

Air Force Command and Its Headquarters

Air Force Command	Headquarter
Central Air Command (CAC)	Prayagraj, Uttar Pradesh
Eastern Air Command (EAC)	Shillong, Meghalaya
Southern Air Command (SAC)	Thiruvananthapuram, Kerala
South-Western Air Command (SWAC)	Gandhinagar, Gujarat
Western Air Command (WAC)	New Delhi
Training Command (TC)+	Bangalore, Karnataka
Maintenance Command (MC)+	Nagpur, Maharashtra

Training

Air Force Academy (AFA)

- ◆ Established in 1971, the Air Force Academy (AFA) at Dundigal, located 43 km from Hyderabad, has earned acclaim as the Indian Air Force's premier training institution.
- ◆ Air Force Administrative College (AFAC):

- The Air Force Administrative College (AFAC) in Coimbatore stands as one of the oldest training establishments in the Indian Air Force.
- Exclusively conducts training programs for in-service officers of the Air Force, Navy, Army, and officers from friendly foreign countries.

Air Force Technical College

- ◆ Training encompasses hands-on experience in electronic and propulsion labs, specialised visits to R&D establishments, aviation, electronic industries, and field units.
- ◆ Maintains a balance between theoretical knowledge and practical skills.
- ◆ Successful completion results in the award of MTech (Aeronautical Engineering) with specialisations by Visveswaraya Technical University, Belgavi, Karnataka.

Flying Training Establishments

- ◆ The Indian Air Force's dedicated Flying Training Establishments (FTE) are designed to train aspiring pilots.
- ◆ Signify progression from basic to advanced flying levels.
- ◆ Graduation, marked by the awarding of Wings, occurs at the Air Force Academy.
- ◆ Flying Training Establishments include:
 - ◆ Air Force Academy (Dundigal) – STAGE 0 & I fly training (six months each) with Joint service training.
 - ◆ Hakimpet (Secunderabad)
 - ◆ Transport Training Wing, Yelahanka (Bangalore)
 - ◆ Bidar (Karnataka), Kalaikunda (West Bengal)

National Defence Academy (NDA)

- ◆ On May 2, 1945, under the leadership of Commander-in-Chief Field Marshal Sir Claude J Auchinleck, a committee was formed to explore the creation of a joint training institution for Armed Forces officers. Visiting foreign training academies for insights, the committee, with Dr. Amarnath Jha as Vice Chairman, worked diligently for 16 months from July 23, 1945, to November 12, 1946.
- ◆ The report, presented to the Chiefs of Staff Committee in 1947, led to the formation of an Interim Joint Inter Services Wing at the

Indian Military Academy, Dehradun. Simultaneously, plans were set in motion to establish a permanent war academy at Khadakwasla (Pune), with Prime Minister Pandit Jawaharlal Nehru laying the foundation stone on October 6, 1949.

- ◆ On January 1, 1949, the Armed Forces Academy, comprising its military Academy and the Indian Military Academy, along with the Joint Services Wing, was commissioned. After two years at JSW, Army cadets progressed to the Military wing for an additional two-year pre-commission training. Naval and Air Force cadets underwent advanced training at Dartmouth and Cranwell in the UK. The interim process culminated on December 7, 1954, with the commissioning of the National Defence Academy, officially inaugurated on January 16, 1955.
- ◆ The National Defence Academy (NDA) at Khadakwasla stands as one of India's prestigious inter-services training establishments, producing brilliant military leaders, astronauts, and numerous recipients of gallantry and distinguished service awards. Operation 'Badli' marked the symbolic shift from Dehradun to Khadakwasla, nestled at the foot of the Sahyadri Ranges in the Western watershed of the Mula river Valley.

Indian Navy

- ◆ Post-independence, the Royal Indian Navy underwent partition, resulting in the formation of the Royal Indian Navy and the Royal Pakistan Navy.
- ◆ On April 22, 1958, Vice Admiral R D Katari made history as the first Indian Naval Officer to assume the role of Chief of the Naval Staff of the Indian Navy.
- ◆ Two-thirds of the Royal Indian Navy's assets remained in India, while the remaining third went to the Pakistan Navy.
- ◆ Rear Admiral JTS Hall, RIN, was appointed as India's inaugural Flag Officer Commanding Royal Indian Navy on August 15, 1947.
- ◆ With India's transition to a Republic on January 26, 1950, the prefix 'Royal' was dropped, renaming it the Indian Navy.
- ◆ On the same day, the Ashoka Lion Motif replaced the Crown in the Royal Indian Navy's Crest, adopting the Vedas' invocation to Lord Varuna as the emblem, with the

motto: 'Sam no Varunah' (Be auspicious unto us Oh Varuna).

- ◆ The Indian Navy's Crest incorporated the inscription 'Satyamev Jayate' below the State Emblem.
- ◆ In 1935, the 'King's Colours' were presented to the Royal Indian Navy by King George, with all 33 laid up at the Indian Military Academy on January 25, 1950.
- ◆ Dr. Rajendra Prasad, then President of India, presented colours to the Indian Navy on May 27, 1951.
- ◆ Navy Day, first celebrated on October 21, 1944, is now observed on December 4 since 1972, honouring naval actions during the 1971 India-Pakistan war and paying homage to martyrs.
- ◆ As the maritime branch of the Indian Armed Forces, the Indian Navy, commanded by the Chief of Naval Staff, operates as a blue-water navy, conducting anti-piracy operations and engaging with other navies in regions like the Persian Gulf, Horn of Africa, Strait of Malacca, South and East China Seas, and the western Mediterranean Sea.

Basic Organisations

- ◆ The Indian Navy, a highly capable three-dimensional force, adeptly operates above, on, and beneath the ocean surfaces to safeguard our national interests.
- ◆ The Chief of the Naval Staff (CNS) commands the Indian Navy operationally and administratively from the Integrated Headquarters of Ministry of Defence (Navy), supported by the Vice Chief of the Naval Staff (VCNS) and three Principal Staff Officers.
- ◆ Three Commands, each under a Flag Officer Commanding-in-Chief, constitute the Navy's structure: Western Naval Command (Mumbai), Eastern Naval Command (Visakhapatnam), and Southern Naval Command (Kochi).
- ◆ The Western and Eastern Naval Commands are Operational Commands, overseeing operations in the Arabian Sea and the Bay of Bengal, while the Southern Command serves as the Training Command.
- ◆ The Indian Navy's backbone comprises the Western Fleet (Mumbai) and the Eastern Fleet (Visakhapatnam), complemented by Flotillas in Mumbai, Visakhapatnam, and Port Blair, ensuring local naval defence in their regions.

- ◆ Naval presence is maintained at various ports along the East and West coasts and island territories, ensuring continuous vigilance in areas of national interest.
- ◆ Naval Officer-in-Charges (NOICs) under each Command handle Local Naval Defence, while the joint responsibility for defending the Andaman & Nicobar Islands lies with the Headquarters, Andaman & Nicobar Command, coordinated by a Commander-in-Chief.
- ◆ The only Tri-Services Command in the Indian Armed Forces, it is led by a Commander-in-Chief appointed in rotation from the three Services.
- ◆ The Local Naval Defence of the Lakshadweep group of islands is overseen by the Naval Officer-in-Charge, Lakshadweep.

Locations: Ports and Shipping

- ◆ Ports serve as pivotal links connecting sea-routes to land trade-routes, playing a crucial role in the maritime landscape.
- ◆ Spanning nine coastal states—Kerala, Karnataka, Maharashtra, Goa, Gujarat, West Bengal, Odisha, Andhra Pradesh, and Tamil Nadu—all Indian ports are strategically located.
- ◆ India boasts 13 major ports and an additional 200 non-major ports.
- ◆ Six of the 13 major ports grace the western coast, while the remaining six, along with one in the Andaman Nicobar Islands at Port Blair, adorn the east coast.
- ◆ Designated as part of the Union list in the Indian Constitution, major ports operate under the purview of the Indian Ports Act of 1908 and the Major Port Trust Act of 1963, each governed by a Board of Trustees appointed by the Government of India.
- ◆ These major ports, responsible for 95% of India's international trade, play a significant role in bolstering the nation's economy.
- ◆ With approximately 7% of the world's merchant mariners being Indian, the Jawaharlal Nehru Port, also known as Nhava Sheva, stands out as the largest container port in India.

The major ports in India include

Coast	Name of Port	State
Eastern Coast	Chennai	Tamil Nadu
Eastern Coast	Paradip	Odisha

(Continues)

80. The North Eastern Council (NEC) was established by the North Eastern Council Act, 1971. Subsequent to the amendment of NEC Act in 2002, the Council comprises which of the following members ?
1. Governor of the Constituent State
 2. Chief Minister of the Constituent State
 3. Three Members to be nominated by the President of India
 4. The Home Minister of India

Select the correct answer using the code given below:

- (a) 1, 2 and 3 only
- (b) 1, 3 and 4 only
- (c) 2 and 4 only
- (d) 1, 2, 3 and 4

Ans: (d)

EXPLANATION:

By the NEC Act 2002, Sikkim was removed from Eastern Council, and included in the North-Eastern Council which is different from the Zonal Councils. Also, Governors and Chief Ministers of Constituent States, and three members nominated by President of India were made its members. The Union Home Minister is ex-Officio Chairman, and the Minister DoNER is the ex-Officio Vice-Chairman of the NEC. Hence, all the listed people are members of the NEC.

81. Consider the following statements :

Statement-I: If the United States of America (USA) were to default on its debt, holder US Treasury Bonds will not be able to exercise their claims to receive payment.

Statement-II : The USA Government debt is not backed by any hard assets, but only by the faith of the government.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (d)

EXPLANATION:

- Statement 1 is incorrect. Sovereign debt default – Governments like UK and USA have been sued legally for claims. The concept of sovereign immunity has eroded since the 1970s.
- Statement 2 is correct. It is true for any Sovereign instrument used by the government to raise finances.

Reference in Lakshya -

A Compendium of General Studies:

9-16 Lakshya—A Compendium of General Studies

The **secondary market** includes venues overseen by a regulatory body like the SEBI (Securities Exchange Board of India) where these previously issued securities are traded between investors. *Issuing companies do not have a role in the secondary market.* The National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) are examples of secondary markets. Stock exchanges have stock indices which denote the overall growth or fall in market, for example the NIFTY of NSE and Sensex of BSE. The secondary market has two different categories: the **auction** and the **dealer markets**. The auction market functions on the **open outcry system** where buyers and sellers congregate in one location and announce the prices at which they are willing to buy and sell their securities. In **dealer markets**, though, people trade through electronic networks. Most small investors trade through dealer markets. Open outcry system has been steadily replaced by electronic markets, though trading floors still exist in both BSE and NSE.

Bond Market (Debt Securities)

A bond is like a formal indebtedness that represents a borrower's obligation to pay back a certain amount of money to the holder of the bond. It outlines the interest rate to be paid until the loan matures and the date when the loan will be repaid. When someone buys a bond, they are essentially lending money to the issuer in exchange for the promise of interest payments and the return of the borrowed amount (known as the principal). This process is called debt finance.

Characteristics of a Bond

Issuer: Bond issuers borrow money from investors against bonds. They are usually issued by the government, government institutions, municipalities, and corporations.

Face Value: The face or par value of the bond is the price of a bond repayable at maturity. This price may differ from the bond price prevailing in the secondary market.

Bond's Term

This refers to the time until the bond matures. Bonds can be short-term (a few months) or long-term (up to 30 years). There are even bonds, like the British perpetuity bond, that never mature and the principal is never repaid; instead, interest is paid indefinitely. Long-term bonds are riskier because savers have to wait longer for repayment, and they often come with a higher interest rate. Bonds can be sold to someone else before maturity, possibly at a lower price.

Credit Risk

Credit risk refers to the likelihood of a borrower failing to make partial or full payments of interest or principal. International corporations, such as Standard & Poor's, use ratings like AAA (the safest) to D (already in default) to assess the creditworthiness of bonds. A higher perceived probability of default leads to increased demand and higher interest rates on bonds. As of now, India's credit rating by S&P is BBB– with a stable outlook.

Coupon Rate: The issuer of the bonds compensates the bondholders by paying them interest. The rate of interest or coupon payment depends upon the economic conditions, the creditworthiness of the issuer, type of bond, maturity, etc. For example, for a 5% coupon rate on a bond with face value ₹10,000, the bondholders will receive $5\% \times ₹10,000 = ₹500$ every year.

$$\text{Coupon Rate} = \frac{\text{Annual Coupon Payment}}{\text{Bond Face Value}} \times 100$$

Tax Treatment: The interest on most of the bonds is taxable income. In countries like USA, the State and Local governments issue bonds called municipal bonds and due to a dual tax policy, the bond owners are not required to pay federal income tax on the interest income due to which these bonds typically pay a lower interest rate than bonds issued by the corporations or the federal government.

Yield: It is the return an investor realizes from the bond for a specific time. The yield can be calculated considering the face value, annual interest, maturity, and the market price of the bond. The current yield is the bond's coupon rate divided by its market price. Price and yield are inversely related and as the price of a bond goes up, its yield goes down. To understand this, say an investor purchases a bond with a face value of ₹1000 that matures in five years with a 10% annual coupon rate. Then, the bond pays an annual interest of 10%, or ₹100.

- ◆ If the interest rate for similar investments rises to 12%, the original bond will still earn a coupon payment of ₹100, which would be

Money Market

The money market is the financial market dealing in debt instruments with **less than a year to maturity** bearing fixed income. The degree of risk is small in the money market, since most of the instruments have a maturity of one year or less. RBI regulates the money market in India.

Instruments of Money Market

- ◆ **Bank deposits** (not considered securities), including term **certificates of deposit or CD** (CD is a negotiable term deposit accepted by commercial banks. It is usually issued through a promissory note. CDs can be issued to individuals, corporations, trusts and so on. Also, the CDs can be issued by Scheduled Commercial Banks [SCBs] at a discount. The duration of CDs varies from three months to one year for SCBs and from one year to a maximum of three years for other financial institutions).
- ◆ **Interbank Loans** (loans between banks)—They are not secured by collateral, so a lender looks exclusively to a borrower's creditworthiness to assess default risks. The most closely watched interbank market is in England, where the **London Interbank Offered Rate** (LIBOR) is determined daily and represents the average price at which major banks are willing to lend to each other.
- ◆ **Money Market Mutual Funds (MMMFs)**—MMMFs are securities offered by companies that invest in other money market instruments—such as commercial paper, certificates of deposit, Treasury Bills and repos. They offer low-risk, short-term investment options, investing in liquid, highly rated instruments. Typically they maintain a stable net asset value (NAV) around \$1 per share.
- ◆ **Commercial Paper**—It is a promissory note (an **unsecured** debt) issued by highly rated banks and some large nonfinancial corporations at a discount. As the instrument is unsecured, loaning depends on the creditworthiness of the issuer. Commercial paper is issued and traded like a security. But because it is short term by nature and not purchased by retail investors, it is exempt from most securities laws.
- ◆ **Treasury Bills**, which are issued by the government, are securities with maturities of less than a year (14–364 days in India). They

are sold at a discount from face value and actively traded after they are issued. These are loans to the federal government and because they are backed by the Government, they are the safest instruments for short-term savings. The markets are deep and liquid, and trading is covered by securities laws.

- ◆ **Securities lending and repurchase agreements (Repos)**—Repos offer competitive interest rates for borrowing and lending on a short-term basis—*usually no more than two weeks (14 days) and often overnight*. A borrower sells a security he owns for cash and agrees to buy it back from the purchaser (who is in effect a lender) at a specified date and at a price margin that reflects the interest charge for borrowing over the period. The security at the heart of the transaction serves as collateral for the lender. Repos are a common tool for central bank OMOs and a method to raise short-term capital.

Importance of Money Market

- ◆ It maintains a balance between the supply of and demand for the monetary transactions.
- ◆ It guides the monetary policies (to be explained in the next section).
- ◆ Short-term interest rates impact long-term rates, and the money market manages this to move funds to capital markets.
- ◆ It sets cash reserve ratio (CRR) and statutory liquidity ratio (SLR) for banks, directing their extra funds to short-term assets to control money supply.
- ◆ Treasury Bills are instruments of OMOs to control inflation in an economy (explained in the next section).

Short-Selling—It happens when a trader agrees to sell a security he or she does not own. To provide such security, the short-seller must borrow it or purchase it temporarily through a repo transaction. The short-seller borrows or buys the security temporarily and must return it to the lender later. If the price falls, the short-seller makes a profit.

Financial Intermediaries

Financial intermediaries are financial institutions through which borrowers can indirectly access to the funds saved in an economy. Two of the most important such institutions are **banks** and **mutual funds**.

82. Consider the following statements :

Statement-I: Syndicated lending spreads the risk of borrower default across multiple lenders.

Statement-II: The syndicated loan can be a fixed amount/lump sum of funds, but cannot be a credit line.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II explains Statement-I
- (b) Both Statement-I and Statement-II are correct, but Statement-II does not explain Statement-I
- (c) Statement-I is correct, but Statement-II is incorrect
- (d) Statement-I is incorrect, but Statement-II is correct

Ans: (c)

EXPLANATION:

- Statement 1 is correct. Syndicating allows lenders to spread risk amongst themselves and partake in financial opportunities too large for their individual capital base.
- Statement 2 is incorrect. The loan can involve a fixed amount of funds, a credit line, or a combination of the two.

83. Consider the following statements in respect of the digital rupee:
1. It is a sovereign currency issued by the Reserve Bank of India (RBI) in alignment with its monetary policy.
 2. It appears as a liability on the RBI's balance sheet.
 3. It is insured against inflation by its very design.
 4. It is freely convertible against commercial bank money and cash.

Which of the statements given above are correct?

- (a) 1 and 2 only (b) 1 and 3 only
(c) 2 and 4 only (d) 1, 2 and 4

Ans: (d)

EXPLANATION:

e-Rupee, or digital rupee is just like normal paper currency, except in the form of digital token based on blockchain technology. Just like normal currency, it is not hedged against inflation, a suggestion which is against the basic economic principles, therefore, only Statement 3 is incorrect.

Reference in Lakshya -

A Compendium of General Studies:

9-38 Lakshya—A Compendium of General Studies

Cross-Border Insolvency

It refers to the situation where an insolvent debtor has assets and/or creditors in more than one country. IBC has no standard instrument to restructure the firms involving cross-border jurisdictions. Currently, it is regulated by Section 234 (which empowers the central government to enter into bilateral agreements with other countries to resolve situations about cross-border insolvency) and Section 235 (whereby the adjudicating authority can issue a letter of request to a court or an authority competent to deal with a request for evidence or action in connection with insolvency proceedings under the Code in countries with the agreement) of IBC. The current provisions are ad hoc in nature, and the need for a standardised framework has been highlighted by the Insolvency Law Committee (ILC), which recommended the adoption of the **United Nations Commission on International Trade Law (UNCITRAL)** adapted to the Indian context. It will help resolve the core issues as listed:

- ◆ **Access:** It allows foreign professionals and creditors direct access to domestic courts and commence and participate in domestic insolvency proceedings against a debtor.
- ◆ **Recognition:** It allows recognition of foreign proceedings and enables courts to determine relief accordingly.
- ◆ **Cooperation:** It provides a framework for cooperation between insolvency professionals and courts of countries.
- ◆ **Coordination:** It allows for coordination in concurrent proceedings in different jurisdictions.

Developments in Banking System

E-Banking: It is an electronic payment system that allows customers to conduct financial transactions through the financial institution's website. Also known as Internet banking, it operates through a core banking system in contrast to traditional branch banking. Virtual banks only have a conventional internet presence, reducing operating costs compared to traditional brick-and-mortar banks.

RTGS and NEFT: They are both electronic methods of inter-bank fund transfer. RTGS stands for *real-time gross settlement* and transactions happen in real-time, that is, immediately, the floor ceiling for transfer being ₹2 lakhs. NEFT stands for *National Electronic Fund Transfer*, whereby transactions occur in batches and are relatively slow. There is no minimum limit for fund transfers.

Immediate Payment Service (IMPS): It is a real-time digital fund transfer platform available

24 × 7 × 365 with a specified daily limit of ₹5 lakhs.

Automated Teller Machines (ATM): Introduced in 1967, it transformed the banking technology. The latest revolutions include the use of biometric authentication in ATMs.

Payments Bank (PayTM): RBI granted a license to launch a payments bank in 2015. Vijay Shekhar Sharma founded it.

The RBI has ordered Paytm Payments Bank to stop accepting deposits, offering credit services or facilitating fund transfers from 29 February this year, effectively bringing its banking services to a screeching halt.

SEBI Introduced Unified Payments Interface (UPI): A Unified Payments Interface (UPI) was introduced by SEBI as a new payment channel in IPOs to retail investors. It is currently the most extensive country's single largest retail payment system in terms of volume of transactions. The transaction limit for such transactions, as per RBI, is now ₹5 lakh. RBI and the Monetary Authority of Singapore announced a project to link UPI and PayNow, targeted for operationalisation by July 2022. Bhutan recently became the first country to adopt UPI standards for its QR code. It is also the second country after Singapore to have BHIM-UPI acceptance at merchant locations.

e-RUPI is a person-specific and purpose-specific digital voucher operable on basic phones, even in the regions that lack an internet connection where the customer does not need to have a bank account. The first use case of e-RUPI was implemented for the COVID-19 vaccination program.

Account Aggregator Framework: An Account Aggregator (AA) is a type of RBI regulated entity (with an NBFC-AA license) that helps an individual securely (end-to-end encryption) and digitally access and share information from one financial institution they have an account with to any other regulated financial institution in the AA network. Data cannot be shared without the consent of the individual. AAs cannot read or resell consumer data. This is first step towards bringing open banking in India and empowering millions of customers to digitally access and share their financial data across institutions in a secure and efficient manner. The framework in banking has been started off with eight of the India's largest banks (Axis, ICICI, HDFC, and IndusInd Banks) and four are going to be able to shortly (State Bank of India, Kotak Mahindra Bank, IDFC First Bank, and Federal Bank).

84. With reference to ancient India, Gautama Buddha was generally known by which of the following epithets ?
1. Nayaputta
 2. Shakyamuni
 3. Tathagata

Select the correct answer using the code given below:

- (a) 1 only (b) 2 and 3 only
(c) 1, 2 and 3 (d) None of the above are epithets of Gautama Buddha

Ans: (b)

EXPLANATION:

- This question is about the epithets which were given to Gautama Buddha.
- Tathagata and Shakyamuni are the names of Buddha.
- The meaning of the Tathagata is, 'thus he came and thus he went, the enlightened one.' So, this is the epithet which is given to Buddha. He belonged to the Shakya clan and was called as Shakyamuni.
- Nayaputta is the epithet, which was given to Vardhaman Mahavir, not to Buddha.
- So, the correct answer is 2 and 3.

85. Consider the following information:

	Archaeological Site	State	Description
1.	Chandraketugarh	Odisha	Trading Port town
2.	Inamgaon	Maharashtra	Chalcolithic site
3.	Mangadu	Kerala	Megalithic site
4.	Salihundam	Andhra Pradesh	Rock-cut cave shrines

In which of the above rows is the given information correctly matched ?

- (a) 1 and 2
(b) 2 and 3
(c) 3 and 4
(d) 1 and 4

Ans: (b)

EXPLANATION:

- The first site given is the archaeological site of Chandraketugarh which is not in Odisha, and it is not a port town. It is basically in West Bengal and is very close to Basirhat. It is not very far from Kolkata.
- The next site is Inamgaon which is in Maharashtra and is a Chalcolithic site after the end of the Indus valley civilization.
- The third site is Mangadu. The original name of Mangadu is Mangavadu and it is located close to the Ashtamudi Kayal or Ashtamudi Lake in Kerala. It is a megalithic site. There is a one more site located close to Chennai and the name of that site is also Mangadu, but that's not a megalithic site.
- The next site is Salihundam. Salihundam is a Buddhist site in Andhra Pradesh, but it is not a rock-cut cave shrine. Basically, at this place, there are Buddhist stupas and Mahaviharas.
- So, only 2 and 3 are correct.

86. Who of the following rulers of medieval India gave permission to the Portuguese to build a fort at Bhatkal ?

- (a) Krishnadevaraya
(b) Narasimha Saluva
(c) Muhammad Shah III
(d) Yusuf Adil Shah

Ans: (a)

EXPLANATION:

- The correct answer is Raja Krishnadevaraya, who in 1510, gave permission to the Portuguese Viceroy Albuquerque to create a fort at Bhatkal.

87. With reference to revenue collection by Cornwallis, consider the following statements:

1. Under the Ryotwan Settlement of revenue collection, the peasants were exempted from revenue payment in case of bad harvests or natural calamities.
2. Under the Permanent Settlement in Bengal, if the Zamindar failed to pay his revenues to the state, on or before the fixed date, he would be removed from his Zamindari.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Ans: (b)

EXPLANATION:

- Under the right worthy settlement of revenue collection, peasants were exempted from paying the taxes. If they faced a natural calamity or a bad harvest, this is a right statement, but only in regard to Ryotwari Settlement, not in regard to the question, because the question asks regarding the revenue collection by Cornwallis. Ryotwari Settlement was not initiated by Cornwallis, but by Thomas Munro. Hence, this is not a right option in this question.
- In permanent settlement, this provision was not there, but then this provision was included in Ryotwari.
- The second statement says that under the permanent settlement in Bengal, if a zamindar is not able to pay the taxes or revenue on the pre-fixed date, it will lead to snatching of his land ownership right or zamindari right.
- This is a right option. This particular provision was called as sunset clause. So, on a fixed date, if the zamindar was not able to pay the revenue, his land ownership would be snatched and bade to somebody else. This is how the British got the right to create a new class of zamindar.
- So, only statement 2 is correct, not statement 1.

Reference in Lakshya -

A Compendium of General Studies:

6-98
Lakshya—A Compendium of General Studies

Maratha Wars

- ◆ The **Initial Anglo-Maratha War** (1775–1782) concluded with the **Treaty of Salbai**.
- ◆ The **Second Anglo-Maratha Battle** took place from year 1803 to 1805.
- ◆ The **Treaty of Bassein** was inked in 1802 among the final Peshwa, Baji Rao II, and the English.
- ◆ The **Second Maratha Battle** came to a close through the **Treaty of Rajghat** in 1806.
- ◆ The **Third Anglo-Maratha Battle** occurred between 1817 and 1818. As a result, the Maratha power diminished, thus leading to the establishment of the State of Satara by the English.

British Administrative Policies in India

- ◆ Wellesley utilised the **Subsidiary Alliance** System to increase British control over Indian States.
- ◆ The **Nizam of Hyderabad** became the **initial Indian ruler** to enter the Subsidiary Alliance System.
- ◆ Marshman called Lord Wellesley, the ‘Akbar of the English East India Company’.
- ◆ In 1793, **Lord Cornwallis** introduced the **Permanent Revenue Settlement** in Bengal, Bihar, Orissa, and parts of Banaras and the northern districts of Madras, a plan formulated by John Shore.
- ◆ The **Ryotwari System**, akin to Akbar’s Zabti system, was implemented in Assam, Madras, and Bombay for revenue collection.
- ◆ The **Mahalwari System** was established in the regions of Awadh, Punjab, NWFP, and sections of Central India.

Executors of British Policies—Governor Generals

Warren Hastings

- ◆ Warren Hastings served from 1772 to 1785 and introduced the quinquennial settlement of land revenue in 1772.
- ◆ He was responsible for codifying Hindu and Muslim laws during his tenure.

- ◆ With the assistance of William Jones, he established the **Asiatic Society of Bengal** in 1784.
- ◆ Upon returning to England, he faced accusation events in 1785.
- ◆ He was appointed as the **first Governor General by the Regulating Act of 1775**. The First Anglo-Maratha Battle unfolded while he was in office.
- ◆ The trial and judicial execution of Maharaja Nandakumar occurred under the administration of Warren Hastings in 1775.
- ◆ Hastings ended the Dual Government in Bengal in 1772.
- ◆ **During Warren Hastings’ tenure, James Augustus Hickey** launched a weekly publication called **Bengal Gazette** or **Calcutta General Advertiser**.
- ◆ Warren Hastings founded a Muhammadan Madrasa in Calcutta.

Lord Cornwallis (1786–1793)

- ◆ In 1793, he implemented the Permanent Settlement.
- ◆ The Police system was established in India during his administration.
- ◆ The Cornwallis Code was introduced, thus emphasising the limited government.

Lord Wellesley (1793–1798)

- ◆ He identified himself as the Bengali Tiger.
- ◆ The Madras Presidency was established by him.
- ◆ He implemented the system of Subsidiary Alliance.
- ◆ Hyderabad was the initial state to authenticate the Subsidiary Alliance in 1798. Following were Tanjore, Awadh, Mysore, Peshawar, Sindhia, Jodhpur, Bhonsle, Jaipur, Mecheri, Berar, Bundi, and Bharatpur.
- ◆ The Second Maratha War was led by Lord Wellesley.
- ◆ The Tuhfat-ul-Muwahhidin (gift to the Monotheists) was authored by Raja Ram Mohan Roy in the course of his tenure.

Lord Minto (1807–1813)

- ◆ In 1809, he authenticated the Treaty of Amritsar, thus involving Ranjit Singh of Punjab and the English.

Lord Hastings (1813–1823)

- ◆ Lord Hastings was granted the title Marquess of Hastings in recognition of his triumph in the Anglo-Nepalese War or the Gorkha War.
- ◆ After the third Anglo-Maratha War in 1818, he dissolved the leadership and incorporated its regions into the Bombay administration.
- ◆ Under the governor-generalship of Hastings, Governor Thomas Munroe introduced the Ryotwari System in the Madras Presidency in 1820.
- ◆ James Thomson introduced the Mahalwari System of land earnings in the North West Region.

Lord William Bentinck (1828–1835)

- ◆ Designated as the initial Governor General of India under the Government of India Act (1833).
- ◆ Renowned as a compassionate Governor General.
- ◆ In 1829, he abolished the custom of Sati and in 1830 eradicated Thagi.
- ◆ Prohibited infanticide of newborn girl child.
- ◆ In 1834, he established the Agra province.
- ◆ Declared English as the language for higher courts, while Persian remained in use for courts at lower level.
- ◆ In 1835, the Committee of Public Instruction's President, Macaulay submitted Macaulay's Minutes.

Sir Charles Theophilus Metcalfe (1835–1836)

- ◆ Lifted restrictions on the print media.
- ◆ Earned the title of the 'Liberator of Press'.
- ◆ The First Afghan War commenced in time of Governor General Lord George Eden Auckland.
- ◆ Lord Edward Law Ellenborough abolished slavery.

Lord Dalhousie (1849–1856)

- ◆ Instituted the 'Doctrine of Lapse' policy.
- ◆ Employed the Doctrine of Lapse to annex Indian states, including Satara (1848), Jaitpur and Sambalpur (1849), Baghatpur (1850), Udai-pur (1852), Jhansi (1853), and Nagpur (1854).

- ◆ Implemented the Woods Despatch, recognised as the Magna Carta of English Education in India, prepared by Charles Wood in 1854.
- ◆ Spearheaded railway development, inaugurating the first railway line in 1853 from Bombay to Thane and another from Calcutta to Raniganj.
- ◆ Catalysed the advancement of the Post and Telegraph systems, thus initiating the first telegraphic line from Calcutta to Agra.
- ◆ Shimla, the capital in summer, was also the headquarters of the army.
- ◆ The Hindu Marriage Act, 1856 was enacted.
- ◆ Commenced the enlisting of the Covenanted Civil Service through examinations in 1853.
- ◆ Enacted the Post Office Act, 1854, first time introducing postage stamps.
- ◆ Witnessed the Santhal Uprising in 1855.
- ◆ The Carnatic Nawab's title was scrapped.

Socio-Religious Reform Movements

Raja Ram Mohan Roy and Brahma Samaj

- ◆ Brahma Samaj and Raja Ram Mohan Roy is highly regarded as the father of Modern India. He is also known as the 'Herald of New Age', the 'Bridge between Past and Future', the 'First Modern Man in India', the Father of the Indian Renaissance, and the Pathfinder of his Century.
- ◆ He had an idea that there exists only one God. He detested worshipping idols.
- ◆ In 1815, he set up the 'Atmiya Sabha' in Calcutta. Its aim was to spread the belief in one God and challenge harmful customs in Hinduism.
- ◆ He found support for his beliefs in the Upanishads.
- ◆ Starting in the year 1821, he began a newspaper titled, 'Sambad Kaumudi'.
- ◆ In the year 1822, Roy launched 'Mirat-ul-Akbar', the first Persian-language journal.
- ◆ In 1822, Roy and Dwaraka Nath Thakur (Tagore) co-founded a newspaper named 'Bangadatta'.
- ◆ He found support for his beliefs in the Upanishads.
- ◆ In 1831, Raja Ram Mohan Roy travelled to England to argue Akbar II's case in front of Board of Control. Akbar Shah II, the then Mughal Emperor, honoured Roy with the title 'Raja'.

88. Consider the following statements :

1. There are no parables in Upanishads.
2. Upanishads were composed earlier than the Puranas.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

Ans: (b)

EXPLANATION:

- Upanishads are full of Neeti Katha or ethical values. For example, some of the very popular words from the Upanishads are 'Satyameva Jayate'.
- Upanishads were composed earlier than the Puranas. Upanishads' composition happened during the later Vedic period and before the emergence of the Mahajanapadas.
- As far as the Puranas are concerned, they also hold a very important position in Hinduism, and their composition majorly happened during the Gupta age, particularly in the 4th and the 5th century AD.
- So, in this question, only statement 2 is correct.

- ◆ The Gayatri Mantra is found in the third mandala of the Rig Veda and is traditionally attributed to the sage **Vishvamitra**.
- ◆ The statement, 'War begins in the minds of men' is linked to the **Atharva Veda**.
- ◆ The **Purusha Sukta hymn**, uncovered within the **Tenth Mandala of the Rig Veda**, depicts the origin of the caste system and the fourfold division of society.
- ◆ The **Upanishads**, consisting of 108 philosophical works, delve into profound spiritual and philosophical teachings.
- ◆ The Upanishads are often referred to as the '**Inanakantas**' or the philosophical essence of the Vedas.
- ◆ The phrase '**Satyameva Jayate**', meaning 'Truth alone triumphs', has been derived from the **Mundaka Upanishad**.
- ◆ The **Brihadaranyaka Upanishad** was the initial scripture to introduce the concept of 'Transmigration of the Soul and Karma'.
- ◆ The **Puranas**, segment of Smriti literature, consist of 18 works, including six Vishnu Puranas, six Shiva Puranas, and also six Brahma Puranas based on the Trimurti.
- ◆ The **Bhagavata Purana** consists of 18 'skandas', and the 10th skanda recounts the childhood adventures of Sri Krishna.
- ◆ **Skanda Purana** holds the distinction of being considered the largest among the Puranas.
- ◆ The Brahma Purana is also recognised by the name **Adipurana**.
- ◆ The Adhyatma Ramayana is incorporated into the **Brahmanda Purana**.

The Early Vedic Society

- ◆ In the Vedic period, cattle were the primary assess of prosperity and wealth.
- ◆ The Rigvedic tribe was known as **Jana**.
- ◆ Tribes were formed by many clans (**vis**).
- ◆ In the societal structure, the basic unit was the '**kula**' or family, overseen by the 'Kulapa' who acted as the head of family.
- ◆ A 'Visah' was a grouping of '**gramas**' or villages.
- ◆ Primary tribal gatherings in the Rigvedic era comprised the **Vidhata, Gana, Sabha, and Samiti**.
- ◆ The term **Aghanya**, found in several segments of the Rig Veda, is associated with cattle.

The Early Vedic Religion

- ◆ The Rigvedic religion can be characterised as a form of **primitive animism**.
- ◆ Among the Aryan deities, **Indra** held the highest status, with Agni following closely.
- ◆ **Varuna** held reverence as the deity associated with water, whereas Yama was recognised as the ruler presiding over the deceased.
- ◆ **Savitri**, the sun deity, is credited with the famous Gayatri Mantra, composed by Vishvamitra.
- ◆ **Prithvi** was venerated as the Earth Goddess.
- ◆ **Indra** was known by the epithet Purandara.
- ◆ During the Vedic period, the **Panis**, mentioned in the Rig Veda, were primarily cattle herders.
- ◆ **Varuna**, among the Vedic gods, was responsible for the authenticity and maintaining moral framework.
- ◆ Lord Indra held a dual role as both a warlord and the deity associated with rain.
- ◆ **Vasishtha and Vishvamitra** were two significant priests during the Rigvedic period.
- ◆ Few of the Vedic gods, including **Indra, Varuna, Mitra, and the two Nasatyas**, were mentioned in the Boghazkoi inscription of Asia Minor dating back to 1,400 BC.

Early Vedic Polity

- ◆ Aryans were divided into five tribes called **Panchajana**.
- ◆ The **Battle of Ten Kings (Dasarajna Yuddha)** described in the Rig Veda took place during a dispute over the division of waters in the River Ravi. The conflict took place along the banks of the River Ravi, also known as Parushni.
- ◆ The 10 kings who participated in the Battle of Ten Kings (Dasarajna Yuddha) against Sudas, the Bharata king of Tritsus family, were from the states of (i) Purus, (ii) Yadus, (iii) Turvasas, (iv) Anus, and (v) Druhyus. Additionally, five other non-Aryan tribes were involved: (vi) Alinas, (vii) Pakhtas, (viii) Bhalanas, (ix) Sibis, and (x) Vishanins.
- ◆ Sudas arose triumphant in the Battle of Ten Kings (Dasarajna Yuddha).

Later Vedic Period (1,000–600 BC)

- ◆ During the later Vedic period, the people used a distinctive kind of pottery called **Painted Grey Ware (PGW)**.

- ◆ In Vedic terminology, 'Aghanya' signifies cows.
- ◆ The terms 'Bharatavarsha' and 'Bharata' were initially used in the Rig Veda.
- ◆ Jabala Upanishad discusses the four Ashramas of the Vedic period.
- ◆ The most significant number of hymns in the Rig Veda are dedicated to praising Indra.
- ◆ Kaushambi was among the earliest towns in the Vedic era to use fired or burnt bricks in construction.
- ◆ The concept of charging interest on lent money is first mentioned in the Shatapatha Brahmana.
- ◆ Rigvedic artworks were unearthed in Bhagvanpura, located in the state of Haryana.
- ◆ Brihadaranyaka Upanishads are the scriptures that discuss the police system.
- ◆ Varuna held the status of God of Gods.
- ◆ Chandalas were the community regarded as untouchable by the Buddhists.
- ◆ The Jains used Prakrit as the language to propagate their faith.
- ◆ Ananda is acknowledged as the St. John of Buddhism.
- ◆ In Buddhist beliefs, Mara is identified as the Devil.
- ◆ Lust, emotion, and desire are the three daughters of 'Mara'.
- ◆ The persecutor of Buddhists was Pushyamitra Sunga.
- ◆ Vishishtadvaita is the primary philosophical school of Bhagavatism.
- ◆ Chandogya Upanishad holds the earliest mention of Sri Krishna.
- ◆ In Greek literature, Sri Krishna is recognised as a Hindu deity.
- ◆ Rishabhadeva (first Tirthankara) was a Jain Tirthankara connected to Sri Krishna.
- ◆ Kottavai was the Tamilian God of Sangam Age associated with battle and victory.
- ◆ Lakulisa is the saint credited with founding Saivism.
- ◆ During the Sangam Age, the Pandyas, a Tamil kingdom, dispatched an ambassador to the court of the Roman Emperor Augustus.
- ◆ The primary Sangam was established by Saint Agastya.
- ◆ Avvaiyar, a renowned poetess, lived during the Sangam period.
- ◆ The term 'Yavanas' indicated the Greeco-Roman traders who journeyed to South India during the Sangam period.
- ◆ 'Manimekhalai' is a Sangam work that delves into Buddhism.
- ◆ Ashoka used the term 'Bhagavati' to denote Buddha.
- ◆ James Prinsep deciphered Ashokan inscriptions in 1837.
- ◆ Menander was the Indo-Greek king whose borders extended up to Pataliputra.
- ◆ Vima Kadphises, the Yuchi ruler, introduced gold coins for the first time.

Art and Culture

Pre-Historic Art

Pre-historic art refers to the visual creations produced by humans in the period **before recorded history**. In the context of India, pre-historic art primarily pertains to the artistic expressions of

ancient civilisations and cultures that existed in the Indian subcontinent before the advent of written records. The pre-historic period in India is marked by the absence of written language, thus making it challenging to provide precise dating or attribution to specific cultures (Table 6.10).

Table 6.10 Pre-historic art

A. Pre-historic rock paintings	Description
1. Overview	In ancient times, without paper or written language, pre-historic people expressed themselves through cave paintings, thus depicting daily life and activities.
a. Purpose of drawings	Possible reasons for pre-historic drawings include adding colour to homes or creating visual records, similar to modern diaries.
b. Global presence	Pre-historic paintings, possibly from the Upper Palaeolithic era, feature animals and human figures found in caves worldwide.

(Continues)

Vedic Literature**Rig Veda**

- ◆ It was the first Veda to be composed.
- ◆ Rig Veda is the earliest collection of 1,028 hymns.
- ◆ Rig Veda is divided into Ten(X) Mandalas (chapters), out of which Mandala II-VII is the oldest, composed during the early Vedic period.
- ◆ Mandala numbers I, VIII, IX, and X were later additions composed during the Later Vedic period.
- ◆ The expert priest of Rig Veda was known as Hotra.

Yajur Veda

- ◆ Yajur Veda is considered the Veda of performance of sacrificial rituals.
- ◆ It provides guidelines for the performance of Yajna and the important Vedic rituals.
- ◆ It is the most popular among all the Vedas.
- ◆ It is split into two sections, namely, Shukla Yajur Veda and Krishna Yajur Veda.
- ◆ The expert priest of Yajur Veda was Adhvaryu.

Sama Veda

- ◆ It is considered the Veda of music.
- ◆ All those hymns of Rig Veda, which were sung, constitute Sama Veda.
- ◆ The later part of Sama Veda is known as Gandharva Veda—it is considered the rule book of music.
- ◆ It mentions about 16,000 Ragas and Raginis.
- ◆ The expert priest of Sama Veda was Udgatar.

Atharva Veda

- ◆ The origin of this Veda can be attributed to Atharva Rishi and Angira Rishi.
- ◆ It is the most elaborate of all the Vedas.
- ◆ It mentions the cure of 99 diseases.
- ◆ It also includes the topics related to astrology, astronomy, mathematics, metallurgy, botanical, and geological knowledge of India.

Classical Sanskrit Literature

Classical Sanskrit literature refers to the literary works composed in Sanskrit, the ancient and classical language of India.

i. Upanishads

- The Upanishads are philosophical texts that explore the nature of reality, the self (atman), and the ultimate truth (Brahman). Examples include the Chandogya Upanishad, Brihadaranyaka Upanishad, and Mandukya Upanishad.

ii. Epics

- **Mahabharata:** Composed by Sage Vyasa, the Mahabharata is an epic narrative that includes the Bhagavad Gita, a sacred dialogue between Lord Krishna and the warrior Arjuna.
- **Ramayana:** Attributed to the sage Valmiki, the Ramayana narrates the story of Lord Rama, his wife Sita, and his loyal companion Hanuman.

iii. Puranas

- The Puranas are a genre of ancient Indian literature that contains mythological stories, legends, and genealogies. Examples include the Vishnu Purana, Shiva Purana, and Bhagavata Purana.

iv. Kavya (Poetry)

- **Kalidasa:** Often considered the greatest poet in classical Sanskrit literature, Kalidasa's works include 'Shakuntala', 'Meghaduta', and 'Raghuvamsha'.
- **Bharavi:** Wrote 'Kiratarjuniya', an epic poem depicting the battle between Lord Shiva and Arjuna.

v. Drama (Nataka)

- **Bhasa:** Though many of Bhasa's works are lost, a few plays such as 'Swapnavasavadatta' have survived. He is considered a pioneer in Sanskrit drama.
- **Kalidasa:** His play 'Shakuntala' is a classic in Sanskrit drama.

vi. Shastra Literature

- **Arthashastra:** Attributed to Chanakya (Kautilya), this ancient treatise covers political science, economics, and military strategy.
- **Kama Sutra:** Attributed to Vatsyayana, it is a comprehensive guide on human sexuality and relationships.

vii. Grammar and Linguistics

- **Panini:** His work 'Ashtadhyayi' is a foundational text in Sanskrit grammar.
- **Patanjali:** Known for his 'Mahabhashya', a commentary on Panini's grammar.

89. Consider the following statements:

1. India is a member of the International Grains Council.
2. A country needs to be a member of the International Grains Council for exporting or importing rice and wheat.

Which of the statements given above is/are correct?

- | | |
|------------------|---------------------|
| (a) 1 only | (b) 2 only |
| (c) Both 1 and 2 | (c) Neither 1 nor 2 |

Ans: (a)

EXPLANATION:

Statement 1 is correct. India is a member of International Grains Council.

Statement 2 is incorrect. Bangladesh, Indonesia, Philippines, etc are grain importing non-member countries.

The International Grains Council (IGC) is an intergovernmental organisation that seeks to:

- further international cooperation in grains trade;
- promote expansion, openness and fairness in the grains sector;
- contribute to grain market stability and to enhance world food security.

90. Which one of the following was the latest inclusion in the Intangible Cultural Heritage List of UNESCO ?
- (a) Chhau dance (b) Durga puja
(c) Garba dance (d) Kumbh mela

Ans: (c)

EXPLANATION:

Garba Dance of Gujarat is the latest addition to UNESCO's Intangible Cultural Heritage List.

91. How many Delimitation Commissions have been constituted by the Government of India till December 2023?
- (a) One (b) Two
(c) Three (d) Four

Ans: (d)

EXPLANATION:

Four Delimitation Commissions have been set up till now following the Delimitation Commission Acts in 1952, 1962, 1972, and 2002. The next one will be setup after the first census post 2026.

Reference in Lakshya -

A Compendium of General Studies:

Indian Polity 1-103

consulting the Public Service Commission, and later approaching the Commission to approve the appointment at a time when the person has gained experience and expertise putting a matter advantage over the new candidates. However, this regularisation has been disallowed by the Supreme Court.

- ◆ Sometimes, the rules of appointment to the office are changed retrospectively to fit an appointee.
- ◆ Sometimes, the reports of the Commissions are presented before the concerned legislature long after the year under the review as the Constitution imposes no specific time limit on the President or the Governor to present the report to the Parliament or the State legislature 'on receipt of such report'. The Constitution says that the report must be presented annually; however, sometimes, the reports are presented 2 or 3 years later in a lump, which defeats the purpose.

All India Service and Central Service

The recruitment and the conditions of an All India Service is regulated by an act of Parliament and currently refers to the Indian Administrative Service, Indian Police Service, and Indian Forest Service regulated by the All India Services Act, 1951. The creation of such services is subject to Article 312 as already discussed earlier.

The 'central services' is an expression, which refers to certain services under the union, maintained on an all-India basis, e.g., the Indian Foreign Service, the Indian Audit and Accounts Service, etc.

Elections

Introduction

The Union Parliament has the authority to make laws relating to the procedure of election to both union and state legislature (Article 327; Entry 72, List I, 7th Schedule). State legislature has the subsidiary power to legislate on electoral matters relating to state legislature insofar as such matters are not covered by a union statute.

Parliament has enacted the Representation of the People Acts, 1950, 1951, as well as the Delimitation Commission Act, 1952, 1962, 1972 (repealed), 2002, and 2003 to prescribe the mode of election and the formation of delimitation of constituencies relating to it.

The Election Commission

Constitution

It is an independent body provided in Article 324.

Composition

- ◆ The election commission shall consist of a chief election commissioner and such other commissioners as may be fixed by the President [Article 324(2)].
- ◆ Through an ordinance of 1993, later converted to law, two additional election commissioners are appointed to the election commission.
- ◆ The President may also appoint regional commissioners, in consultation with the election commission, on the eve of a general election to the Lok Sabha or to any Vidhan Sabha, to assist the election commission [Article 324(4)].

Tenure and Conditions of Service

- ◆ They are determined by the Parliament by law.
- ◆ The chief election commissioner can only be removed from office in the same way and for the same reasons as a Supreme Court judge.
- ◆ The President may not remove the other election commissioners unless the chief election commissioner recommends it.

Functions

All elections for the state and union legislatures, as well as for the offices of President and Vice President, must be overseen, directed, and carried out by the election commission [Article 324(1)].

Innovations: None of the Above (NOTA)

In 2009, the ECI proposed to offer a 'none of the above' button on voting machines. On 27th September, 2013, the Supreme Court in a PIL filed (in 2009) by *People's Union for Civil Liberties* pronounced the right of the Indian citizens to negative voting by exercising the 'None of the Above' option in EVMs and ballot papers.

92. The constitution (71st Amendment) Act, 1992 amends the Eighth Schedule to the constitution to include which one of the following languages?

- | | |
|------------|-------------|
| 1. Konkani | 2. Manipuri |
| 3. Nepali | 4. Maithili |

Select the correct answer using the code given below:

- | | |
|----------------|----------------|
| (a) 1, 2 and 3 | (b) 1, 2 and 4 |
| (c) 1, 3 and 4 | (d) 2, 3 and 4 |

Ans: (a)

EXPLANATION:

Maithili was included during Mr. Vajpayee's tenure by Constitution (92nd Amendment) Act, 2003.

93. Consider the following pairs :

	Party	Its Leader
1.	Bharatiya Jana Sangh	Dr. Shyama Prasad Mukherjee
2.	Socialist Party	C. Rajagopalachari
3.	Congress for Democracy	Jagjivan Ram
4.	Swatantra Party	Acharya Narendra Dev

How many of the above are correctly matched?

- | | |
|----------------|--------------|
| (a) Only one | (b) Only two |
| (c) Only three | (d) All four |

Ans: (b)

EXPLANATION:

- CORRECT - Bhartiya Jana Sangha was founded by Shyama Prasad Mukherjee, Professor Balraj Madhok and Deendayal Upadhyaya in 1951.
- FALSE - C. Rajagopalachari founded the classical liberal Swatantra Party (1959-74). The Socialist Party was founded a short interval after India's independence by Jayprakash Narayan, Rambriksh Benipuri, Basawon Singh (Sinha) and Acharya Narendra Dev who led the Congress Socialist Party out of the Congress umbrella.
- CORRECT - Congress for Democracy was founded by Jagjiva Ram in 1977 in response to denouncement of Smt. Indira Gandhi's role in Emergency. It contested with Janta Alliance in the 1977 General Elections.
- FALSE - As stated in explanation to statement 2.

94. Which of the following statements are correct about the Constitution of India?

- Powers of the Municipalities are given in Part IX A of the Constitution.
- Emergency provisions are given in Part XVIII of the Constitution.
- Provisions related to the amendment of the Constitution are given in Part XX of the Constitution.

Select the answer using the code given below?

- | | |
|------------------|------------------|
| (a) 1 and 2 only | (b) 2 and 3 only |
| (c) 1 and 3 only | (d) 1, 2 and 3 |

Ans: (d)

EXPLANATION:

Part IX A of the Constitution mentions the Powers of the Municipalities. Part XVIII contains the Emergency provisions, and provisions related to the amendment of the Constitution are given in Part XX of the Constitution.

95. Which one of the following statements is correct as per the Constitution of India ?

- Inter-State trade and commerce is a State subject under the State List.
- Inter-State migration is a State subject under the State List.
- Inter-State quarantine is a Union subject under the Union List.
- Corporation tax is a State subject under the State List.

Ans: (c)

EXPLANATION:

Statements (a) and (b) are wrong, as both Inter-State trade and commerce and Inter-State migration are subjects in the Union List. Being subjects with territorial jurisdiction beyond the State boundaries, they cannot in any way be placed in the State List. Corporation tax lies in Union List. The only remaining statement (c) is correct and Inter-State quarantine lies in Union List.

Reference in Lakshya -

A Compendium of General Studies:

Indian Polity 1-79

E m r e n c y

- ◆ During such proclamation, the Union can give executive directions to the state with respect to any matter.
- ◆ The President may declare the constitutional machinery to be broken and seize all or any of the state's administrative powers (Article 356).
- ◆ Directions like described in Chapter 20 can be issued during a financial emergency.

Mutual Assigning of Executive Powers

- ◆ The Union may assign to a state Government or its personnel, with the state Government's approval, its own executive duty pertaining to any topic [Article 258(1)]. On the other hand, a state Government may delegate any of its executive responsibilities to the former with permission from the Union Government (Article 258A).
- ◆ By legislation, the Union Parliament may assign its officials or the state Government its responsibilities, even without the state Government's approval [Article 258(2)].

Distribution of Financial Powers

Principle of Distribution of Tax Revenues: The Constitution makes a distinction between the legislative authority to impose taxes and the authority to appropriate the money collected in order to guarantee a fair allocation of funds between the two federation entities.

Distribution of Legislative Powers to Levy Taxes

- ◆ Specific entries in the Union and state legislative lists in Schedule VII designate the respective legislative authorities of the Union and the states with regard to taxes. For instance, the Parliament has the authority to impose income taxes on non-agricultural incomes, but the state legislature has the authority to tax agricultural lands.
- ◆ The residuary legislative power with respect to taxation belongs to Parliament. There is no concurrent sphere in the matter of tax legislation.

Constitutional Limitations on Tax Legislation

- ◆ **Professions tax:** A tax on a profession, trade, calling, or occupation may be imposed by the

state legislature, but the total amount that an individual must pay in taxes cannot exceed Rs. 2,500 annually [Article 276(2)].

- ◆ **Sales Tax:** While the state may impose taxes on the sale or purchase of commodities, no tax shall be imposed on sales or purchases made outside of the state (inter-state trade and commerce being the sole domain of Union legislation) or during the course of significant exports from India (Article 286). Furthermore, conditions set by the Parliament limit state taxation in cases where the sale involves products that the Parliament has deemed to be particularly significant for inter-state trade and commerce. Sugar, tobacco, cotton, silk, and woollen fabrics have been declared as goods of special importance in inter-state trade and commerce under the Additional Duties of Excise (Goods of Special Importance) Act, 1957.
- ◆ **Tax on Consumption or Sale of Electricity:** No state law may impose taxes on the sale or use of electricity (produced by anyone) that is purchased or used by the Indian government or used by a railway company in the course of the government's construction, maintenance, or operation of railways (Article 287).
- ◆ **Immunity from Mutual Taxation:**
 - The property of the Union, except as, otherwise, provided by Union law, is exempted from all the taxes imposed by the state or its subordinate authority [Article 285(1)].
 - On the other hand, a state's income and property are not subject to Union taxes [Article 289(1)]. But, the immunity is limited to taxes imposed on real estate. Thus, state property is subject to customs duties.
 - Furthermore, the exemption only applies to the state government and excludes any local government located within the state.
 - Generally speaking, states are exempt from Union income taxes on money received from commercial operations. However, a state is subject to Union taxes if it engages in any trade or business that is not ancillary to the government's regular operations [Article 289(2)].

Distribution of Proceeds of Taxes

- ◆ Taxes Exclusive to the Union: For example, customs, corporation tax, fees in respect of matters in Union list, etc.

96. Under which of the following Articles of the Constitution of India, has the Supreme Court of India placed the Right to Privacy?
- | | |
|----------------|----------------|
| (a) Article 15 | (b) Article 16 |
| (c) Article 19 | (d) Article 21 |

Ans: (d)

EXPLANATION:

Interpreted by the Supreme Court in *K.S. Puttaswamy v. Union of India* (2017).

Freedom of Press

The press has no special privileges and its freedom emerges from **Article 19(1)(a)**. The standard laws of taxation, labour relations, and employee service conditions do not exempt the press. Although there is no express clause in the Constitution that forbids press censorship, it must be determined by applying the reasonableness standard as defined by Article 19(2).

The first Indian Act to regulate the press was the Press (Objectionable Matter) Act of 1951. It expired in 1956 after which the Prevention of Publication of Objectionable Matter Act was passed in 1976. It was later repealed in 1977.

Art 361A was inserted by Constitution (44th Amendment) Act in 1978. It says that unless it can be demonstrated that the publication was done maliciously, no one will be held accountable for any civil or criminal proceedings in any court relating to the publication in a newspaper of a substantially true report of any proceedings (apart from secret sittings) of either House of Parliament or the State Legislature.

Illustration

- ◆ In *Virendra versus state of Punjab*, the Supreme Court annulled one of the provisions of **Punjab Special Powers (Press) Act, 1956** on the grounds that while literature of a specified class likely to cause communal disharmony can be prohibited for a temporary period, complete prohibition of bringing in to the State of any newspaper without providing a right of representation to the affected party was unreasonable.
- ◆ However, there is a corollary to this decision that even at the time of peace, based on reasonable safeguards, censorship may be valid. This is often seen in the magisterial orders under Section 144 of Criminal Procedure Code issued by District Administrations from time to time.

Article 20

It provides protection from retrospective¹⁹ criminal legislation (ex post facto legislation) (Cl.1), double jeopardy²⁰, or punishment for the same offence more than once (Cl.2), and from compulsion to give self-incriminating evidence (oral or documentary) (Cl.3).

¹⁹ When a law impacts actions or inactions taken after it takes effect, it is referred to as prospective. A retrospective law includes in its scope both actions and inactions taken in the future and those taken before the law in question was enacted.

²⁰ The American Constitution employs the word 'double jeopardy' but our Constitution does not.

Exceptions/Illustrations

- ◆ Immunity from procedures other than those before a court of law or judicial tribunal is not granted by Article 20. Therefore, departmental proceedings for the same violation may still be applicable to a government employee who has received legal punishment for the same offence.
- ◆ The prohibition from Cl.3 is not attracted in civil proceedings and *not until a formal accusation has been made*. Therefore, an accused can be medically examined and his fingerprints and specimen can be collected.

Personal Liberty (Articles 21 and 22)

Article 21

No person shall be deprived of his life or personal liberty except according to the procedure established by law.

The Supreme Court stated in *A. K. Gopalan versus State of Madras, 1967*, that the phrase 'procedure established by law' embodied the English concept of personal liberty and that there was no protection against arbitrary legislative intrusion on personal liberty.

In a landmark judgement, *Maneka versus Union of India, 1978*, this view was overturned the view in Gopalan's case. It held that *Articles 19 and 21 are not watertight compartments*; therefore, a law depriving a person of personal liberty must prescribe a procedure, which shall be fair and reasonable.

Illustrations

- ◆ Article 21 includes right to live with human dignity and, thus, right to minimum subsistence allowance.
- ◆ **Euthanasia**: It does not include the right to die. The Supreme Court in *Gian Gaur's* case held that assisted suicide and active euthanasia are not legal. The Supreme Court in *Aruna Ramchandra Shanbaug* case noted that there is no statutory provision as to the legal procedure for withdrawing life support to a person in permanent vegetative state (PVS) or who is, otherwise, incompetent to take such decision. *It held that passive euthanasia should be permitted* and further laid down procedure for the same, which shall continue until the Parliament makes a law on the subject.

97. What are the duties of the Chief of Defence Staff (CDS) as head of the Department of Military Affairs?

1. Permanent Chairman of Chiefs of Staff Committee
2. Exercise military command over the three Service Chiefs
3. Principal Military Advisor to Defence Minister on all tri-service matters

Select the correct answer using the code given below:

- | | |
|------------------|------------------|
| (a) 1, 2 and 3 | (b) 1 and 2 only |
| (c) 2 and 3 only | (d) 1 and 3 only |

Ans: (d)

EXPLANATION:

Some of the duties and functions of the Chief of Defence Staff (CDS) include the following:

- To head the Department of Military Affairs in Ministry of Defence and function as its Secretary.
- To act as the Principal Military Advisor to Hon'ble Raksha Mantri on all Tri-Service matters. Hence, Statement 3 is correct.
- To function as the Permanent Chairman of the Chiefs of Staff Committee. Hence, Statement 1 is correct.
- To administer the Tri-Service organizations/agencies/commands.
- To be a member of Defence Acquisition Council chaired by Hon'ble Raksha Mantri.

Statement 2 is incorrect. CDS will not exercise any military command, including over the three Service Chiefs, so as to be able to provide impartial advice to the political leadership.

Source:

<https://pib.gov.in/Pressreleaseshare.aspx?PRID=1597425>

<https://pib.gov.in/newsite/PrintRelease.aspx?relid=198899#:~:text=To%20act%20as%20the%20Principal,by%20Hon'ble%20Raksha%20Mantri>

98. Operations undertaken by the Army towards upliftment of the local population in remote areas to include addressing of their basic needs is called :

- (a) Operation Sankalp (h) Operation Maitri
(c) Operation Sadbhavana (d) Operation Madad

Ans: (c)

EXPLANATION :

The Indian Army under 'Operation Sadbhavana (Goodwill)' is reaching out to local communities in far-flung areas of the region through a series of civilian programmes aimed at improving the lives of people in remote areas of Union Territory (UT) of Ladakh. It addresses their basic needs. From engaging youngsters in sporting activities and debates on issues such as drug abuse, the Army is also organising medical camps and capacity-building tours for students and farmers regularly under the operation.

Source:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1895974>

https://www.business-standard.com/article/pti-stories/operation-sadbhavana-improving-lives-indian-army-118051300175_1.html

99. The longest border between any two countries in the world is between:

- (a) Canada and the United States of America (b) Chile and Argentina
(c) China and India (d) Kazakhstan and Russian Federation

Ans: (a)

EXPLANATION:

Canada and the United States shares the longest international land border measuring 8,893 Km. The border is divided into two: the border shared with Canada by the continental United States and the border that the state of Alaska shares with northern Canada.

Source:

<https://www.worldatlas.com/articles/countries-with-the-longest-land-borders.html>

100. Which of the following statements about the Ethics Committee in the Lok Sabha are correct?

1. Initially it was an ad-hoc Committee.
2. Only a Member of the Lok Sabha can make a complaint relating to unethical conduct of a member of the Lok Sabha.
3. This Committee cannot take up any matter which is sub-judice.

Select the answer using the code given below:

- (a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

Ans: (c)

EXPLANATION:

- Statement 1 is correct. It was and continues to be an ad-hoc committee (constituted for a limited duration).
- Statement 2 is incorrect. Any person or member can make a complaint in writing to the committee.
- Statement 3 is correct. The Committee cannot take up any sub-judice matter for consideration. (The question has context in the expulsion of Lok Sabha member Mahua Moitra).